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# DRAFT ENVIRONMENTAL IMPACT STATEMENT

## PROPOSED CLOSURE OF MYRTLE BEACH AFB, SOUTH CAROLINA

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UNITED STATES AIR FORCE

JULY 1990

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United States Air Force

July 1990



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# COVER SHEET

## DRAFT ENVIRONMENTAL IMPACT STATEMENT PROPOSED CLOSURE OF MYRTLE BEACH AIR FORCE BASE, SOUTH CAROLINA

- a. **Responsible Agency:** U.S. Air Force
- b. **Proposed Action:** Closure of Myrtle Beach Air Force Base (AFB), South Carolina
- c. **Comments and inquiries should be directed to:** Lt Col Tom Bartol, Director of Programs and Environmental, AFRCE-BMS/DEP, Norton AFB, California 92409-6448, (714) 382-4891.
- d. **Designation:** Draft Environmental Impact Statement (DEIS)
- e. On 29 January 1990, the Secretary of Defense announced a proposal to close a number of military installations, including four Air Force bases. Myrtle Beach AFB, South Carolina, is one of the bases proposed for closure by early 1993. In accordance with the National Environmental Policy Act (NEPA), the potential environmental consequences of that action, reasonable alternatives to the proposed action, and the no action alternative have been analyzed and are described in this DEIS. The reasonable alternatives to closure of Myrtle Beach AFB analyzed and described in this DEIS are closure of Davis-Monthan AFB, Arizona, or England AFB, Louisiana. The DEIS includes analyses of community setting, land use and aesthetics, transportation, utilities, hazardous materials/wastes, geology and soils, water resources, air quality, noise, biological resources, and cultural and paleontological resources. Adverse impacts to the human (biophysical) environment were found to be negligible. Remediation of hazardous waste sites on the bases will be conducted in accordance with the Installation Restoration Program and some additional data recovery to evaluate sites potentially eligible for the National Register of Historic Places will be undertaken prior to disposal of excess property. Beneficial impacts to the environment from reductions in air pollutant emissions and noise levels would result from base closure. When the Air Force closes a base, a caretaker force is established to maintain buildings, grounds, and essential utility systems, and to control access to the base. The property would be declared excess and made available only to the General Services Administration (GSA) for reuse by other federal agencies or for disposal to local governments or the private sector. GSA is responsible for compliance with NEPA and the property disposal laws.
- f. **Comments should be received by:** 10 September 1990

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# SUMMARY

## PURPOSE AND NEED

The Department of Defense (DOD) has a policy of identifying and disposing of facilities that are no longer essential to support current or planned force levels. In late 1989, the Air Force assessed its facility requirements in light of a perceived reduction in the Soviet military threat and future fiscal constraints, which led to plans to scale down the United States military force structure. These conclusions were reported to the Secretary of Defense. On January 29, 1990, the Secretary of Defense announced a proposal to close a number of military bases, including Myrtle Beach Air Force Base (AFB), South Carolina. The other Air Force bases proposed for closure in that announcement were Los Angeles AFB, California; Eaker AFB, Arkansas; and Bergstrom AFB, Texas.

One of the Air Force considerations for scaling down the Air Force structure is to retire some A-10 aircraft. The 354th Tactical Fighter Wing at Myrtle Beach AFB flies A-10 aircraft. If the A-10 aircraft now at Myrtle Beach AFB were retired and no other flying mission were to replace it, there would no longer be a sufficient reason to keep the base open.

Alternatives to the closure of Myrtle Beach AFB that have been studied are closure of Davis-Monthan AFB, Arizona, and England AFB, Louisiana, which also host A-10 aircraft; and the no action alternative of not closing Myrtle Beach AFB or the alternative bases. The decision on whether or not to proceed with the proposed closure of Myrtle Beach AFB or its alternatives will be made after consideration of the environmental consequences of the proposal as described in this Environmental Impact Statement (EIS), as well as other factors.

When the Air Force closes a base, the property is declared excess and made available only to the General Services Administration (GSA) for reuse by federal agencies or for disposal to local governments or the private sector. GSA is responsible for compliance with the National Environmental Policy Act (NEPA) and the property disposal laws. However, the Air Force would cooperate with GSA and would assist the local communities in that process through the DOD's Office of Economic Adjustment.

## SCOPE OF STUDY

The Air Force initiated the scoping process on 9 February 1990 with the publication in the *Federal Register* of the Notice of Intent (NOI) to prepare an EIS to address impacts of the proposed closure of Myrtle Beach AFB, South Carolina. A public scoping meeting was held on 15 March 1990 in Myrtle Beach, South Carolina. The NOI announcing that Davis-Monthan AFB and England AFB would be studied as alternatives to the proposed closure of Myrtle Beach AFB was published on 4 May 1990. The scoping meetings were conducted on 22 May 1990 in Tucson, Arizona, and on 23 May 1990 in Alexandria, Louisiana, to solicit public comments and to identify environmental concerns related to the possible closure actions. Comments were also invited on the environmental issues that should be analyzed in subsequent studies on the final disposition/reuse of base properties. The scope of study for this EIS was based on the results of the public scoping process, discussions with public officials, past experience with programs of a similar nature, and the requirements of NEPA.

According to the Council on Environmental Quality regulations for implementing NEPA, "The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment" (40 CFR 1500.1). The focus of this EIS is, therefore, on evaluation of impacts to the environment associated with the proposed action and its alternatives. To provide the context in which impacts to the environment may occur, discussions of potential changes to community setting, land use and aesthetics, transportation, and community utility services are included in the EIS. In addition, issues related to current and future handling and management of hazardous materials/wastes are discussed.

Impacts to the natural environment are evaluated for geology and soils, water resources, air quality, noise, biological resources, and cultural and paleontological resources. These impacts may occur as a direct result of base closure or as an indirect result of changes to the community or changes in hazardous material/waste management practices.

## **OTHER RELATED STUDIES**

The Air Force is conducting five other studies as required by Title 10 United States Code (USC) 2687 prior to making a decision on base closures. These studies include strategic, operational, budgetary, fiscal, and local economic consequences. The Air Force will consult with state and local officials during preparation of the Local Economic Consequences Study. Copies of the economic study will be made available to members of Congress, state and local officials, and state Single Points of Contact under Executive Order 12372, *Intergovernmental Review of Federal Programs*.

## **CHANGES TO THE LOCAL COMMUNITIES**

Base closure would cause changes in the support communities for Myrtle Beach AFB, Davis-Monthan AFB, and England AFB.

### **Myrtle Beach Air Force Base, South Carolina**

**Community Setting.** It is estimated that closure of Myrtle Beach AFB would result in the loss of approximately 4,000 onbase jobs and 1,500 secondary jobs. Total migration from the area would be approximately 16,200, about 10 percent of the current (1990) population in Horry County. Personal income in the area would decline by approximately \$112 million, and local spending would decline by approximately \$124 million annually. These reductions in employment, population, and spending may result in other socioeconomic effects such as increases in housing vacancy rates and the closure of certain public and commercial facilities. However, these socioeconomic consequences would not result in impacts to the biophysical environment and are therefore not discussed in this document.

**Land Use and Aesthetics.** The commercial lodging facilities would no longer be an incompatible use in the south Accident Potential Zone (APZ) 1 because military APZs would no longer exist. The commercial recreational development now in the south Clear Zone would continue to be incompatible with the Federal Aviation Administration's Runway Protection Zone land use criteria for the Myrtle Beach Jetport. Buildings and grounds on Myrtle Beach AFB would be minimally maintained until final disposition is decided; therefore, some aesthetic changes may occur. Administration of the Fort Fisher Air Force Recreation Area would be transferred to another military installation in the region.

**Transportation.** Long-term reductions in base-related traffic (9,300 vehicles per day) should have a positive impact on local roadways. Roadways in the Myrtle Beach area should not be adversely affected by increased short-term truck traffic for transporting equipment. Air traffic in the Myrtle Beach area would be reduced substantially with the termination of the flying mission at Myrtle Beach AFB.

**Utilities.** Reduced water and energy consumption would have a positive impact on resource conservation. Wastewater reduction (32% of current average flows) would have a minimal impact on the operation of the new Schwartz Wastewater Treatment Plant. Reduction in solid waste from the base would extend the lifespan of the Horry County landfill by 6 months.

## **Davis-Monthan Air Force Base, Arizona**

**Community Setting.** It is estimated that closure of Davis-Monthan AFB would result in the loss of approximately 6,800 onbase jobs and 3,600 secondary jobs. Total migration from the area would be approximately 15,700, about 2.3 percent of the current (1990) population of Pima County. Personal income in the area would decrease by approximately \$183 million annually, and local spending would decrease by approximately \$231 million annually. These reductions in employment, population, and spending may result in other socioeconomic effects such as increases in housing vacancy rates and the closure of certain public and commercial facilities. However, these socioeconomic consequences would not result in impacts to the biophysical environment and are therefore not discussed in this document.

**Land Use and Aesthetics.** Although aircraft operations at the base would be reduced considerably, residential and other development in APZs 1 and 2 will continue to be incompatible with Air Installation Compatible Use Zone guidelines because the runway will remain open and operational. Land use changes from the base closure would depend on possible future amendments to local land use plans and zoning ordinances. Buildings and grounds on Davis-Monthan AFB would be minimally maintained until final disposition is decided; therefore, some aesthetic changes may occur.

**Transportation.** Long-term reductions in base-related traffic (30,000 vehicles per day) should have a positive impact on local roadways. Roadways in the Tucson area should not be adversely affected by increased short-term truck traffic for transporting equipment. Air traffic in the Tucson area would be reduced substantially with the termination of the primary flying mission at Davis-Monthan AFB.

**Utilities.** Reduced water and energy consumption would have a positive impact on resource conservation. Wastewater reduction (7.2% of current average flows) would have no impact on the operation of the Roger Road Wastewater Treatment Plant. Reduction in solid waste from the base would extend the life of the Los Reales landfill slightly.

## **England Air Force Base, Louisiana**

**Community Setting.** Closure of England AFB is expected to result in the loss of approximately 3,700 onbase jobs and 1,200 secondary jobs. Total migration from the area would be approximately 11,000, about 7.6 percent of the current (1990) population in Rapides Parish. Personal income in the area is expected to decrease by approximately \$73 million annually, and local spending would decrease by approximately \$94 million annually. These reductions in employment, population, and spending may result in other socioeconomic effects such as increases in housing vacancy rates and the closure of certain public and commercial facilities. However, these socioeconomic consequences would not result in impacts to the biophysical environment and are therefore not discussed in this document.

**Land Use and Aesthetics.** Residential areas northwest of the base would no longer lie in APZ 1. Current restrictions on development around the base could be removed if local zoning ordinances were amended accordingly. Buildings and grounds on England AFB would be minimally maintained until final disposition is decided; therefore, some aesthetic changes may occur.

**Transportation.** Long-term reductions in base-related traffic (9,300 vehicles per day) should have a positive impact on local roadways. Roadways in the Alexandria area should not be adversely affected by increased short-term truck traffic for transporting equipment. Air traffic in the Alexandria area would be reduced substantially with the termination of the flying mission at England AFB.

**Utilities.** Reduced water and energy consumption would have a positive effect on resource conservation. Wastewater reduction (13.6% of current average flows) would have no effect on the operation of the Alexandria treatment plant. Reductions in solid waste from the base would extend the life of the Alexandria landfill slightly.

## **HAZARDOUS MATERIALS/WASTES**

The Installation Restoration Program is independent of the closures and will continue unaffected. Base closures would reduce hazardous materials storage, use, and the potential for spills and accidents - all positive impacts. Positive impacts are expected from the remediation of hazardous materials such as asbestos, underground and aboveground storage tanks, and radioactive wastes.

## **IMPACTS TO THE ENVIRONMENT**

Environmental impacts associated with closure of Myrtle Beach AFB, Davis-Monthan AFB, or England AFB are summarized in Table S-1. Under the no action alternative, all the bases would remain active. All units currently assigned to the bases would not be inactivated or relocated. The base structure would be maintained at its current level. Beneficial environmental impacts associated with base closure would not be realized.

Table S-1

**Environmental Impacts Associated With Closure of  
Myrtle Beach AFB, Davis-Monthan AFB, and England AFB**

Resource Category	Impacts of Base Closure		
	Myrtle Beach AFB	Davis-Monthan AFB	England AFB
Geology and Soils	No impact on geologic resources. Reduced potential for soil contamination and disturbance.	No impact on geologic resources. Reduced potential for soil contamination and disturbance.	No impact on geologic resources. Reduced potential for soil contamination and disturbance.
Water Resources	Reduced contamination risk for surface and groundwater. Reduced groundwater use (550 million gallons/year); minor positive impact on groundwater supply. Reduced wastewater flow (32% of current plant flow); positive impact on water quality at effluent discharge point.	Reduced contamination risk for surface and groundwater. Reduced groundwater use (1.3 billion gallons/year); minor positive impact on groundwater supply. Reduced wastewater flow (7.2% of current plant flow); positive impact on water quality at effluent discharge point.	Reduced contamination risk for surface and groundwater. Reduced groundwater use (730 million gallons/year); minor positive impact on groundwater supply. Reduced wastewater flow (13.6% of current plant flow); positive impact on water quality at effluent discharge point.
Air Quality	Reduced (90%) base air pollutant emissions. Minimal positive impact to local air quality.	Reduced (75%) base air pollutant emissions. Minimal positive impact to local air quality.	Reduced (90%) base air pollutant emissions. Minimal positive impact to local air quality.
Noise	Offbase residential areas (195 acres) no longer exposed to $L_{dn}$ 65-75 dB. Remaining noise levels from Jetport operations do not exceed $L_{dn}$ 70 dB and are within base boundaries.	Offbase residential areas (980 acres) no longer exposed to $L_{dn}$ 65-75 dB. Remaining noise levels from aircraft activities would be minimal and within base boundaries.	Offbase residential areas (160 acres) no longer exposed to $L_{dn}$ 65-75 dB.
Biological Resources	Reduced disturbance of wildlife from base activities. Reduced quality of presently maintained wildlife habitat. No impacts on threatened and endangered species expected.	Reduced disturbance of wildlife from base activities. Reduced quality of presently maintained wildlife habitat. No impacts on threatened and endangered species expected.	Reduced disturbance of wildlife from base activities. No impacts on threatened and endangered species expected.
Cultural and Paleontological Resources	No expected impacts on cultural or paleontological resources. Five sites potentially eligible for the National Register of Historic Places (NRHP) would be maintained.	No expected impacts on cultural or paleontological resources. Six sites potentially eligible for the NRHP would be maintained.	No impacts on cultural or paleontological resources. No sites are eligible for the NRHP.

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## **1.0 PURPOSE AND NEED FOR ACTION**

### **1.1 INTRODUCTION**

The Department of Defense (DOD) has a policy of identifying and disposing of facilities, property, and installations that are no longer essential to support current or planned force levels. In late 1989, the Air Force assessed its facility requirements in light of a perceived reduction in the Soviet military threat and future fiscal constraints, which led to plans to scale down the United States military force structure. These conclusions were reported to the Secretary of Defense, who on January 29, 1990, announced a proposal to close a number of military bases, including Myrtle Beach Air Force Base (AFB), South Carolina. The other Air Force bases proposed for closure in that announcement were Los Angeles AFB, California; Eaker AFB, Arkansas; and Bergstrom AFB, Texas.

One of the considerations for scaling down the Air Force structure is to retire some A-10 aircraft. The 354th Tactical Fighter Wing at Myrtle Beach AFB flies A-10 aircraft. If the A-10 aircraft now at Myrtle Beach AFB were retired and no other flying mission were to replace it, there would no longer be a sufficient reason to keep the base open.

Base closure is defined as inactivation or transfer of all units, personnel, and equipment from the base. No construction or demolition activities are planned as a part of the proposed closure. Routine military flying activities, including use of the runway by aircraft from other military installations, would cease because support services would no longer be available. A caretaker team would be established to maintain buildings, grounds, and water supply and other utility systems, and to provide adequate base security.

Alternatives to the closure of Myrtle Beach AFB that have been studied are closure of Davis-Monthan AFB, Arizona, and England AFB, Louisiana, which are the only other bases in the continental United States that host A-10 missions, and the no action alternative of not closing Myrtle Beach AFB or the alternative bases. The Air Force has prepared this Environmental Impact Statement (EIS) to assess the potential environmental impacts of the proposed action and alternatives. The decision on whether or not to proceed with the proposed closure of Myrtle Beach AFB or its alternatives will be made after consideration of the environmental consequences of the proposal, as well as other factors.

Separate EISs are being prepared to assess the potential environmental impacts associated with the proposed closure of Los Angeles AFB, Eaker AFB, and Bergstrom AFB, and the bases that are alternatives to closure of those bases. No decision has been made on the closure of Myrtle Beach AFB or the other bases. The EISs are being prepared to allow the decision maker to select from among any of the bases being analyzed in the EISs. It is possible that decisions would be made to close either fewer or more than the four bases announced.

When the Air Force closes a base, the property is declared excess and made available only to the General Services Administration (GSA) for reuse by federal agencies or for disposal to local governments or the private sector. GSA is responsible for compliance with the National Environmental Policy Act (NEPA) and the property disposal laws. However, the Air Force would cooperate with GSA and would assist the local communities in that process through the DOD's Office of Economic Adjustment.

### **1.2 SCOPING PROCESS**

The Council on Environmental Quality regulations implementing NEPA require an early and open process for determining the scope of issues related to the proposed action. The Air Force initiated this process with the publication of a Notice of Intent (NOI) to prepare an EIS for the proposed closure of Myrtle Beach AFB, South Carolina, in the *Federal Register* on 9 February 1990, and for the study of Davis-Monthan AFB, Arizona, and England AFB, Louisiana, as alternatives, on

4 May 1990. Soon after publication of the respective NOIs, written requests were sent by the Air Force to the responsible federal, state, and local agencies to submit their concerns and issues to be analyzed in the EIS. On 15 March 1990, a public scoping meeting was conducted at the Convention Center in Myrtle Beach, South Carolina, to solicit comments and identify concerns related to the closure of Myrtle Beach AFB. Public scoping meetings for Davis-Monthan AFB in Tucson, Arizona, and England AFB in Alexandria, Louisiana, were held on 22 May 1990 and 23 May 1990, respectively. The scope of study for this EIS was based on the results of the public scoping process, discussions with public officials, past experience with programs of a similar nature, and the requirements of NEPA.

### **1.2.1 Summary of Scoping Issues**

#### **1.2.1.1 Myrtle Beach Air Force Base, South Carolina**

A wide range of issues related to the natural and social environment were identified at the scoping meeting or in written statements received before or after the meeting. Comments that are related to environmental issues and addressed in this EIS include potential impacts of base closure on soil and water resources from possible contamination by toxic/hazardous substances on the base; biological communities, endangered species, and wetland ecology; and air quality from emissions of toxic/hazardous substances from hazardous waste sites onbase.

A number of comments were made on the socioeconomic impacts of base closure and on the use of the base for other military or civilian activities. Socioeconomic concerns focused on the loss of jobs and income and population outmigration resulting in short- and long-term effects on the economy, the loss of medical and other services to military retirees, and the overburdening of community hospitals with the closure of the base hospital. Numerous concerns were expressed over decreases in school enrollments and the loss of revenues to school districts, the loss of tax revenues for municipal services, the potential for utility rate increases, and lower real estate values because of increased housing vacancies.

Concerns were raised that the closure of Myrtle Beach AFB may encourage establishment of heavy industrial facilities at this site, or that low country wetlands and southern tobacco/rice farms may be transformed to industrial zones in order to attain economic stability, resulting in greater environmental pollution. Reuse of the base as a prison was seen as detrimental to the tourist industry. Suggestions were made to use the buildings at the base for educational, medical, and business institutions. Suggestions were also made to transfer new military missions to Myrtle Beach AFB or to use the base in support of drug interdiction operations. Comments to keep Myrtle Beach AFB open included its good flying weather, quality of life benefits for military members, excellent efficiency ratings for the base, and close cooperative working relationships between the base and the local community.

#### **1.2.1.2 Davis-Monthan Air Force Base, Arizona**

A wide range of issues related to the natural and social environment were identified at the scoping meeting or in written statements received before or after the meeting. Comments that are related to environmental issues and addressed in this EIS include potential impacts of base closure on soil and water resources from possible contamination by toxic/hazardous substances on the base and a reduction in noise levels from fewer military aircraft flights.

Most of the comments centered on the socioeconomic impacts of base closure, to keep Davis-Monthan AFB open, or to use it for other military or civilian activities. Socioeconomic concerns were related to the loss of jobs and income exacerbating the already depressed economy, particularly the banking and real estate sectors; and the loss of medical and other services to military retirees. Also mentioned were decreases in school enrollments and a significant loss of revenues to school districts, the loss of

tax revenues affecting municipal services, and an increase in housing vacancies resulting in a further decrease in property values in an already depressed housing market.

Suggestions were made to transfer new military missions to Davis-Monthan AFB or to use the base as a spaceport, commercial airport, or cargo port. Comments to keep Davis-Monthan AFB open included its strategic location, good quality of life benefits for base personnel, year-round flying weather, low altitude airspace availability, and agreements with nearby communities to allow low-level flights for training and supersonic flights over land.

#### **1.2.1.3 England Air Force Base, Louisiana**

A wide range of issues related to the natural and social environment were identified at the scoping meeting or in written statements received before or after the meeting. Comments that are related to environmental issues and addressed in this EIS were limited to the benefits realized as a result of cooperation between the local communities and the base, particularly the adoption of land use control ordinances compatible with the Air Installation Compatible Use Zone.

Most of the comments related to the socioeconomic impacts of base closure and the benefits of keeping England AFB open. Socioeconomic comments emphasized the loss of jobs and income from base closure in an area where high unemployment is chronic and the economy is stagnant. Concern was also expressed over losing block grants if the City of Alexandria's population falls below 50,000 as a result of population outmigration. Other socioeconomic concerns focused on the loss of local tax revenues affecting municipal services, degradation of utility services in the absence of base demand, an increase in housing vacancies resulting in lower property values, degradation of neighborhoods, and collapse of financial institutions. Also addressed were the loss of medical and other services to military retirees, a decrease in school enrollments and a significant loss of revenues to school districts, and overall degradation in the quality of life for Louisiana residents.

Most speakers at the public scoping meeting urged keeping the base open to avoid adverse effects on the economy and human environment of the area. Reasons suggested for keeping England AFB open included its strategic location with respect to supporting Army installations, low altitude airspace availability and accessibility, and close community relations.

#### **1.2.2 Issues Beyond the Scope of the Environmental Impact Statement**

Concerns and issues regarding impacts that would be caused by the disposal of the facilities or their reuse were also expressed in the public scoping meetings and through written comments received during the comment period. Issues that were identified that are beyond the scope of this EIS include the following:

- Environmental and socioeconomic impacts of disposition/reuse of the closed base.
- Potential socioeconomic impacts that are not related to the physical and natural environment (40 CFR 1508.14).

#### **1.2.3 Related Studies**

Other studies have been recently completed or are being conducted by federal, state, or local agencies that are closely related to the proposed closure of Myrtle Beach AFB or its alternatives. In addition to this EIS, the Air Force is conducting five other studies as required by Title 10 USC 2687. These are:

- A strategic study that will address the changing global military power base and examine the interplay between force structure, national defense policy, and power projection requirements. This study will also address the impact of reducing conventional, strategic, and space systems as the threat to national security is reduced.
- An operational study that will address the operational environment of aircraft and identify special operational characteristics, restricted areas, military operating areas, range-use rights, joint military/civilian use, and other significant operational issues. It will also include all tenant units and joint service missions, supported or needing replacement if the decision is made to close the installation.
- A budgetary study that will determine current-year programmed dollar costs and savings associated with the relocation or retirement of the aircraft and the inactivation or relocation of associated operations and support units.
- A fiscal study that will use the budget evaluation as a springboard, and analyze past, present, and future costs and savings associated with the retirement of aircraft and the inactivation or relocation of associated operational and support units. Costs of closing and savings will be detailed through a life-cycle cost model.
- A local economic consequences study that will address the direct payroll loss to the immediate community and the secondary payroll impact on local businesses caused by the loss of military personnel, dependents, and civilian workforce. In addition, the study will examine the effects on the local real estate market and schools from a loss of personnel. If data are available, the study will address losses to other local industries that depend on the base. The study will also cover projected growth in the community and the potential for reuse, both interim and long term.

### 1.3      **RELEVANT FEDERAL, STATE, AND LOCAL STATUTES, REGULATIONS, AND GUIDELINES**

#### *Federal:*

- NEPA: Requires consideration of environmental impacts in federal decision making.
- President's Council on Environmental Quality Regulations: Implement the NEPA process.
- Endangered Species Act of 1973: Conserves ecosystems for the use of endangered or threatened species.
- National Historic Preservation Act: Protects districts, buildings, sites, and objectives significant to American history.
- Clean Water Act: Reduces water pollution and the discharge of toxic and waste materials into all waters.
- Clean Air Act: Reduces air pollution dangerous to public health, crops, livestock, and property.
- Resource Conservation and Recovery Act: Regulates the management of hazardous waste.

- Federal Insecticide, Fungicide, and Rodenticide Act: Controls the application of pesticides to provide greater protection to humans and the environment.
- Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act: Provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and the cleanup of inactive hazardous waste disposal sites.
- Toxic Substance Control Act: Regulates commerce and protects human health and the environment by requiring testing and use restrictions on certain chemical substances.
- Intergovernmental Review of Federal Programs, Executive Order 12372: Provides the opportunity for state and local governments to request federal financial assistance or direct federal development.

***Air Force:***

- Environmental Impact Analysis Process (Air Force Regulation [AFR] 19-2): Gives specific procedural requirements for Air Force implementation of the NEPA.
- Pollution Abatement and Environmental Quality (AFR 19-1): States policies and assigns responsibilities for the development of an organized, integrated, and multidisciplinary environmental protection program to ensure the Air Force, at all levels of command, conducts its activities in a manner that protects and enhances environmental quality.
- Environmental Pollution Monitoring (AFR 19-7): Sets up environmental pollution monitoring program for Air Force installations.
- Interagency and Intergovernmental Coordination of Land, Facility, and Environmental Plans, Programs, and Projects (AFR 19-9): Requires intergovernmental and interagency coordination.
- Conservation and Management of Natural Resources (AFR 126-1): Provides policies, procedures, and functional responsibilities for managing and conserving soil, water, forest, fish, wildlife, and outdoor recreation resources on Air Force lands.
- Natural Resources Land Management (AFR 126-2): Provides for development, improvement, maintenance, and conservation of real property on DOD installations.
- Air Force Policy on Management of Asbestos at Bases For Which the General Services Administration is the Disposal Agent: Directs bases proposed for closure to conduct surveys and take necessary remedial action.

***State of South Carolina:***

- South Carolina Antiquities Act: Establishes a committee to oversee the preservation of archaeological sites and materials; establishes a permitting process and enforcement procedures.
- South Carolina Pollution Control Acts of 1971 and Amendments: Establish an authority to adopt water and air standards, issue permits, and conduct hearings.

- South Carolina Air Pollution Control Regulations: Provides air pollution standards and establish permitting procedures.
- South Carolina Ambient Air Quality Standards: Define emissions standards, monitoring requirements, and testing and air pollution control technology requirements.
- South Carolina National Pollutant Discharge Elimination System Permit Regulations: Identify permit requirements, schedules, and monitoring.
- South Carolina Water Classification Standards: Establish standards for water quality.
- South Carolina Hazardous Waste Management Act of 1978: Establishes a state board to oversee establishment of rules and regulations for hazardous waste management.
- South Carolina Hazardous Waste Management Regulations: Establish standards for hazardous waste, storage, transportation, and disposal of various types of waste.
- South Carolina Guidelines for Waste Disposal Permits: Establish permitting procedures for different types of waste disposal.
- South Carolina Coastal Zone Management Act of 1977: Establishes a state council to oversee protection and safe development of coastal zones.

*State of Arizona:*

- Arizona Air Pollution Control Laws: Establish emission standards and controls on sources of emissions of air contaminants to ensure the health, safety, and general welfare of citizens to protect property values and to protect plant and animal life.
- Arizona Water Pollution Control Law: Establishes a state water quality control council to supervise and control the establishment of water quality standards and to enforce such standards.
- Arizona Rules and Regulations for Sewage Systems and Waste Treatment Works: Require permits prior to construction of any sewage system, including septic tank systems, treatment works, and reclamation systems.
- Arizona Solid Waste Management Law: Establishes standards and procedures regarding the collection, source separation, storage, transportation, treatment, and disposal of solid waste at public facilities.
- Arizona Hazardous Waste Disposal Law: Establishes a hazardous waste management program equivalent to and consistent with the federal hazardous waste regulations.

*State of Louisiana:*

- Louisiana Environmental Affairs Act: Establishes regulation and control over water quality, air quality, solid and hazardous waste, and radiation.
- Louisiana Ambient Air Quality Standards: Provide standards of ambient air quality and limits of air contamination by particulate and gases.

- Louisiana Water Control Law: Establishes a system to control and regulate the discharge of waste materials, pollutants, and other substances into the waters of the state.
- Louisiana Regulation on Reports of Industrial Waste Discharges: Requires the submission of reports for the discharge of industrial waste and for the construction of treatment works.
- Louisiana Solid Waste Management and Resource Recovery Law: Establishes rules, regulations, and standards for the transportation, processing, resource recovery, and disposal of solid waste consistent with the general solid waste management plan. Requires permits for all solid waste disposal facilities in the state.
- Louisiana Hazardous Waste Control Law: Establishes a framework for the regulation, monitoring, and control of the generation, transportation, treatment, storage, and disposal of hazardous wastes.
- Louisiana Resource Recovery and Development Act: Establishes a comprehensive program for management, storage, collection, transportation, utilization, processing, and disposal of waste on a regional basis.

***Local:***

- No local statutes or regulations pertain to the base closure process.

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## **2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION**

### **2.1 INTRODUCTION**

The perceived reduction in the Soviet military threat has provided the opportunity to consider scaling down the United States military force structure. Growing fiscal constraints on the United States Government mandate efficient consolidation of the nation's force structure and the elimination or retirement of weapon systems no longer required to support national policy. The Department of Defense is, therefore, studying the closure of numerous military installations across the United States, including Myrtle Beach Air Force Base (AFB), South Carolina.

The Air Force forecasts a reduction in A-10 aircraft worldwide and the removal of the A-10 from the continental United States Close Air Support force structure. Overseas drawdown will occur in conjunction with Conventional Forces in Europe reductions. Budget savings can be realized by consolidation or elimination of force structure. Removal of the A-10 aircraft from Myrtle Beach AFB presents an opportunity to study the base for closure.

### **2.2 DESCRIPTION OF THE PROPOSED ACTION**

The proposed action is to close Myrtle Beach AFB by the beginning of fiscal year (FY) 1993. Closure of Myrtle Beach AFB would involve the inactivation or relocation of the following units (Figure 2.2-1):

- Inactivation of 354th Tactical Fighter Wing (TFW). Its assets (72 A-10A aircraft) would be retired, made available for foreign military sales, and/or used to modernize the Forward Air Control (FAC) force.
- Relocation of the Southwest Asia Fuels Mobility Support Equipment (FMSE) Storage facility to MacDill AFB, Florida.
- Relocation of 73rd Tactical Control Squadron (TCS) to Moody AFB, Georgia.
- Relocation of the 1816th Reserve Advisor Squadron, Detachment 2, OL-1 to Langley AFB, Virginia.
- Inactivation of all remaining Myrtle Beach AFB units, as appropriate.
- Transfer of management responsibilities of the Fort Fisher Recreation Annex (354th CSG/OL-AA) to Seymour Johnson AFB, North Carolina.

The mission of the 354th TFW is to maintain the capability to deploy worldwide and to provide Close Air Support and anti-armor operations in a low, medium, or high threat environment; to execute tactical fighter missions; and to destroy enemy forces and equipment using the A-10 aircraft equipped with a 30-millimeter cannon, Maverick air-to-ground missiles, and a wide range of other conventional munitions.

The 354th TFW consists of three flying squadrons: the 353rd, 355th, and 356th Tactical Fighter Squadrons, with 24 A-10s each. Other organizations within the wing include the 354th Air Base Operability Squadron, 354th Aircraft Generation Squadron, 354th Civil Engineering Squadron, 354th Component Repair Squadron, 354th Combat Support Group, 354th Comptroller Squadron, 354th Equipment Maintenance Squadron, 354th Medical Group, 354th Mission Support Squadron,

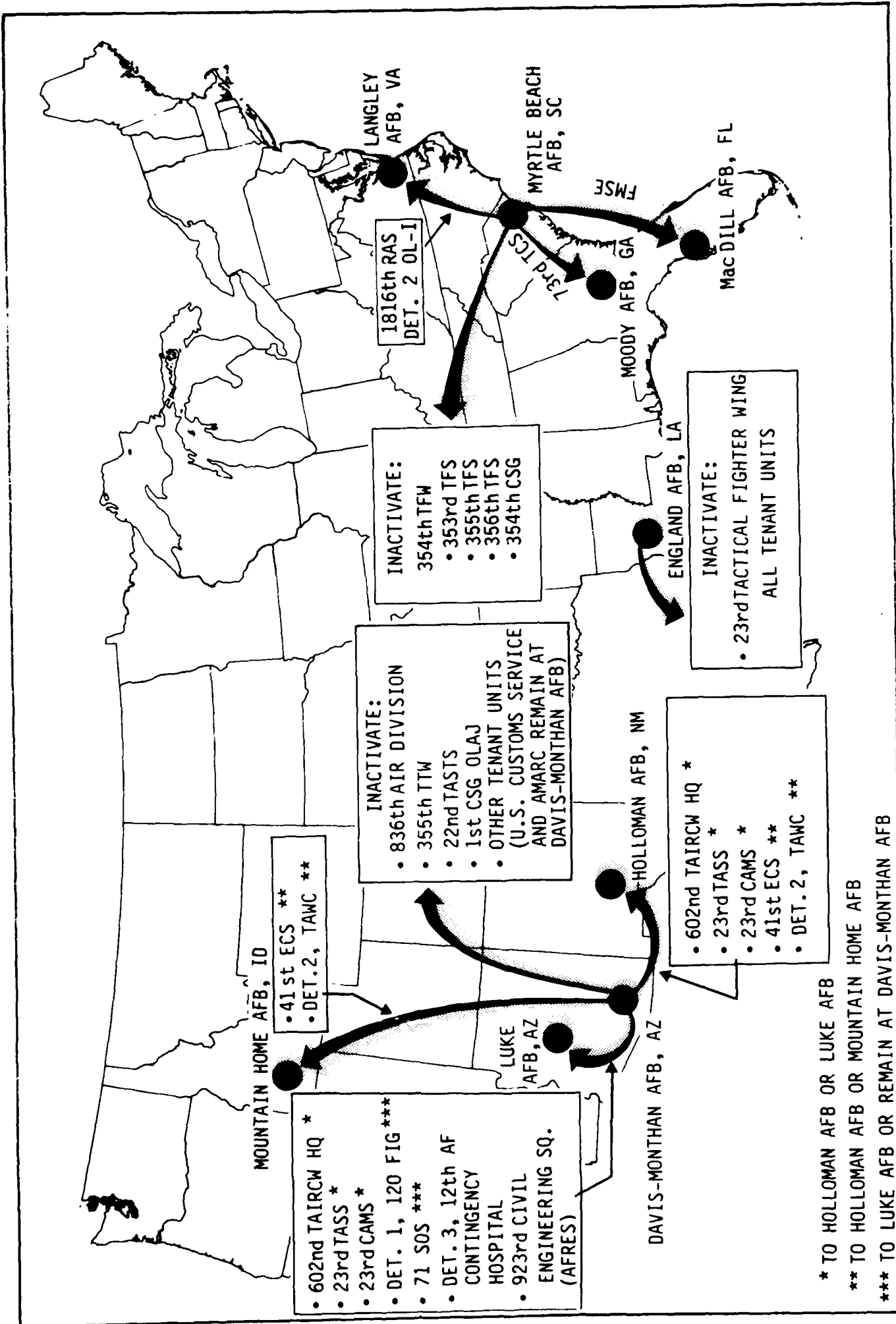


FIGURE 2.2-1 RELOCATION OR INACTIVATION OF UNITS FROM MYRTLE BEACH AFB, SOUTH CAROLINA, DAVIS-MONTHAN AFB, ARIZONA, AND ENGLAND AFB, LOUISIANA

354th Security Police Squadron, 354th Services Squadron, 354th Supply Squadron, and 354th Transportation Squadron. The 354th TFW and all its component organizations would be inactivated.

The Southwest Asia FMSE storage area is located at Myrtle Beach AFB. The FMSE is operated by the 354th Supply and Transportation squadrons. The purpose of FMSE is to provide mobile fuels support for contingency operations in southwest Asia. If Myrtle Beach AFB is closed, the fuels support equipment and responsibility will be transferred to the 56th Supply and Transportation Squadrons at MacDill AFB, Florida, where an existing FMSE storage area is presently maintained. This will permit joint use of personnel, equipment, and facilities.

Myrtle Beach AFB is also the home of the 73rd TCS, a FAC Post that provides radar surveillance and air weapons control. The 73rd TCS would be relocated to Moody AFB, Georgia, to allow for increased utilization of tactical air control assets.

The only Tactical Air Command (TAC) tenant unit at Myrtle Beach AFB is Operating Location BB of the 1st Combat Support Group. This unit would be inactivated by the proposed action.

Major tenant (non-TAC) units at Myrtle Beach AFB include the 2066th Communications Squadron (Air Force Communications Command, AFCC); the 301st Field Training Unit (Air Force Training Command); Detachment 3, 3rd Weather Squadron (Military Airlift Command, MAC); Detachment 2105, Air Force Office of Special Investigations; and Detachment 217, Air Force Commissary Service (AFCOMS). These units would be inactivated as a result of the proposed action. The 1816th Reserve Advisor Squadron, Detachment 2, OL-I, would relocate to Langley AFB, Virginia.

**Manpower Drawdown Schedule.** At the end of FY 1989, Myrtle Beach AFB employed a total of 3,264 military personnel (302 officers and 2,962 enlisted), 483 appropriated fund civilian personnel, and 460 other civilian personnel (ERIS 1989). Independent of base closure, personnel authorizations will change over the next several years. By the first quarter of FY 1992, military authorizations will increase slightly to 3,270 military (310 officers and 2,960 enlisted), and civilian authorizations will be reduced to 680. The actual numbers of personnel will probably be slightly lower than the authorizations. If a decision is made to close the base, personnel reductions will begin in the second quarter of FY 1992 and continue according to the schedule illustrated in Figure 2.2-2.

**Alternatives.** As alternatives to closure of Myrtle Beach AFB, the Air Force is considering closure of other bases that host A-10 missions. There are two A-10 bases in the continental United States in addition to Myrtle Beach AFB: Davis-Monthan AFB, Arizona, and England AFB, Louisiana.

## **2.3 ALTERNATIVE 1, DAVIS-MONTHAN AIR FORCE BASE, ARIZONA**

Davis-Monthan AFB, Arizona, is an alternative to the proposed action of closing Myrtle Beach AFB. Closure of Davis-Monthan AFB would involve the following unit inactivations or relocations (Figure 2.2-1):

- Inactivation of the 836th Air Division and its component organizations which include 836th Air Base Operability Squadron, 836th Civil Engineering Squadron, 836th Combat Support Group, 836th Comptroller Squadron, 836th Medical Group, 836th Mission Support Squadron, 836th Security Police Squadron, 836th Services Squadron, 836th Supply Squadron, and 836th Transportation Squadron.
- Inactivation of the 355th Tactical Training Wing (TTW) composed of three flying squadrons: the 333rd, 357th, and 358th Tactical Fighter Training Squadrons.

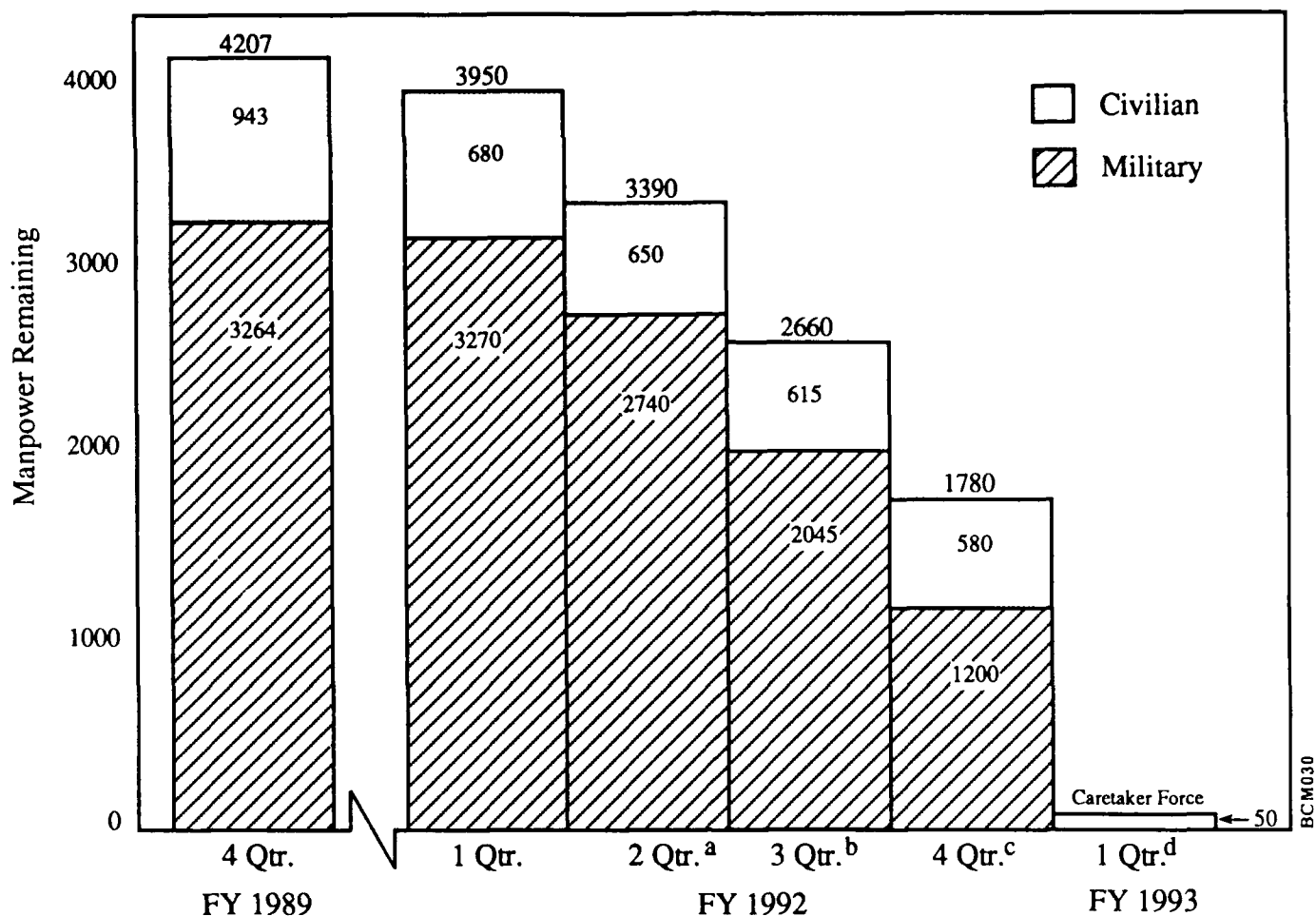


FIGURE 2.2-2 MANPOWER DRAWDOWN SCHEDULE FOR THE PROPOSED CLOSURE OF MYRTLE BEACH AFB, SOUTH CAROLINA<sup>e</sup>

Notes:

- a. Inactivate: 356 TFS
- b. Inactivate: 355TFS; 53 COMBAT COMM, OL-DD
- c. Inactivate: 353 TFS; 1 CSG OLBB; 354 AGS; 354 CRS; 354 EMS; 3752 FTD, DET 301  
Relocate: 73 TCS; 1816 RAS, DET 2, OL I, FMSE
- d. Inactivate: 354 ABOS; 354 CES; 354 CSG; 354 CPRS; 354 MED GP; 354 MSS; 354 SPS;  
354 SVCS; 354 SUPS; 354 TRANS; 354 TFW; AF LEGAL SVC CTR;  
AFCOMS, DET 217; AAFES; 2066 COMM SQ; 3 WS, DET 3; AFOSI, DET 720  
Transfer: 354 CSG/OLAA  
Close: DODD SCHOOL
- e. Manpower authorizations represent end of quarter projections; caretaker force is estimated at 50 personnel.

- Inactivation of four component organizations of the 355th TTW (355th Aircraft Generation Squadron, 355th Component Repair Squadron, 355th Equipment Maintenance Squadron, and 355th Tactical Training Squadron).
- Inactivation of 22nd Tactical Air Support Training Squadron (TASTS), a unit of the 602nd Tactical Air Control Wing (TAIRCW).
- Relocation of the TAIRCW headquarters, the 23rd Tactical Air Support Squadron, and the 23rd Consolidated Aircraft Maintenance Squadron (two units of the TAIRCW) to Holloman AFB, New Mexico, or Luke AFB, Arizona.
- Relocation of the 41st Electronic Combat Squadron and Detachment 2, Tactical Air Warfare Center to Mountain Home AFB, Idaho, or Holloman AFB, New Mexico.
- Inactivation of the following tenant units: 1903rd Communications Squadron (AFCC); Detachment 13, 25th Weather Squadron (MAC); Detachment 512, 3752nd Field Training Squadron; Detachment 516, Air Force Audit Agency; and Detachment 702, Air Force Commissary Service.
- Relocation of the 71st Special Operations Squadron (Air Force Reserves) to Luke AFB, Arizona, or remain in operation at Davis-Monthan AFB, Arizona.
- Relocation of Detachment 1, 120th Fighter Interceptor Group of the Montana Air National Guard to Luke AFB, Arizona, or remain in operation at Davis-Monthan AFB, Arizona.
- Relocation of Detachment 3, 12th Air Force Contingency Hospital to Luke AFB, Arizona.
- Relocation of the 923rd Civil Engineering Squadron (Air Force Reserves) to Luke AFB, Arizona.

Two organizations, U.S. Customs Service and the Aerospace Maintenance and Regeneration Center (AMARC), would remain in operation at Davis-Monthan AFB.

**Manpower Drawdown Schedule.** At the end of FY 1989, Davis-Monthan AFB employed a total of 5,393 military personnel, 1,444 appropriated fund civilian personnel, and 657 other civilian personnel (ERIS 1989). Because of fiscal and other constraints that are independent of base closure, personnel authorizations will be reduced over the next several years. By the last quarter of FY 1991, personnel authorizations will be reduced to 5,170 military (570 officers and 4,600 enlisted) and 1,660 civilian personnel. The actual numbers of personnel will probably be slightly lower than the authorizations. If a decision is made to close the base, personnel reductions will begin in the first quarter of FY 1992 and continue according to the schedule illustrated in Figure 2.3-1.

#### **2.4 ALTERNATIVE 2, ENGLAND AIR FORCE BASE, LOUISIANA**

England AFB, Louisiana, is an alternative to the proposed action of closing Myrtle Beach AFB. Closure of England AFB would involve the following unit inactivations (Figure 2.2-1):

- Inactivation of the 23rd TFW consisting of three flying squadrons: the 74th, 75th, and 76th Tactical Fighter Squadron, and other organizations within the wing including: 23rd Air Base Operability Squadron, 23rd Aircraft Generation Squadron, 23rd Civil

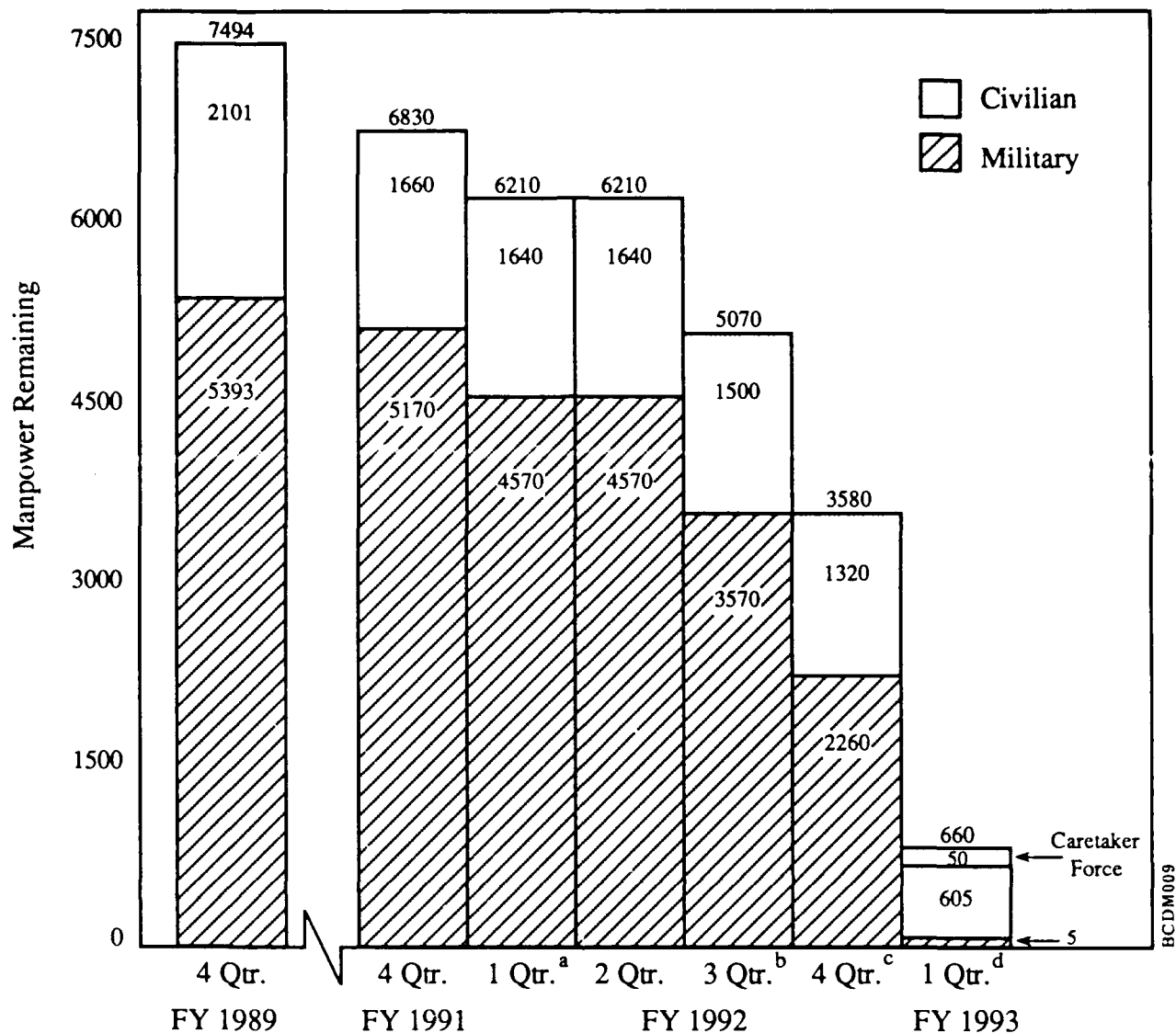


FIGURE 2.3-1 MANPOWER DRAWDOWN SCHEDULE FOR THE PROPOSED CLOSURE OF DAVIS-MONTHAN AFB, ARIZONA<sup>e</sup>

Notes:

- a. Inactivate: 22 TASTS; 333 TFTS
- b. Inactivate: 357 TFTS  
Relocate: 602 TAIRCW; 23 TASS; 23 CAMS
- c. Inactivate: 358 TFTS; 355 TTW; 355 AGS; 355 CRS; 355 EMS; 355 TTS  
Relocate: DET 3, 12 USAF CONTINGENCY HOSPITAL; 71 SOS; 923 CES
- d. Inactivate: 836 AD; 836 ABOS; 836 CES; 836 CSG; 836 CPRS; 836 MED GP; 836 MSS; 836 SPS; 836 SVCS; 836 TRANS; 1 CSG OLAJ; AFAA DET 516; 2400 RES RED MOB SQ; DET 512, 3752 FTD; 3790 MED SVC TNG WG; 1903 COMM SQ; DET 702, AFCOMS; AAFES; AF LEGAL SVC CTR; DET 13, 25 WS; DET 1816, AFOSI  
Relocate: 41 ECS; DET 2, TAWC; DET 1, 120 FIG
- e. Manpower authorizations represent end of quarter projections; caretaker force is estimated at 50 personnel.

Engineering Squadron, 23rd Component Repair Squadron, 23rd Combat Support Group, 23rd Comptroller Squadron, 23rd Equipment Maintenance Squadron, 23rd Medical Group, 23rd Mission Support Squadron, 23rd Security Police Squadron, 23rd Services Squadron, 23rd Supply Squadron, and 23rd Transportation Squadron.

- Inactivation of the Operating Location AP of the 1st Combat Support Group.
- Inactivation of other major tenant units including the 1908th Communications Squadron (AFCC); Detachment 309, 3752nd Field Training Squadron (ATC); 23rd Combat Comm OL-BD; Detachment 210, AFCOMS; Detachment 5, 3rd Weather Squadron (MAC); and Detachment 810, Air Force Office of Special Investigations.

**Manpower Drawdown Schedule.** At the end of FY 1989, England AFB employed a total of 3,293 military personnel, 604 appropriated fund civilian personnel, and 341 other civilian personnel. As a result of fiscal and other constraints that are independent of base closure, personnel authorizations will be reduced over the next several years. By the last quarter of FY 1991, personnel authorizations will be reduced to 3,122 military (299 officers and 2,823 enlisted) and 553 civilian personnel. The actual numbers of personnel will probably be slightly lower than the authorizations. If a decision is made to close the base, personnel reductions will begin in the first quarter of FY 1992 and continue according to the schedule illustrated in Figure 2.4-1.

## **2.5 NO ACTION ALTERNATIVE**

With the no action alternative, Myrtle Beach AFB, Davis-Monthan AFB, and England AFB would remain open. Units currently assigned to the bases would not be inactivated or relocated. The base structures would be maintained their current level. The no action alternative would not alleviate growing fiscal constraints nor allow for the necessary streamlining of current or programmed force structure.

## **2.6 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION**

Two alternatives were investigated but were eliminated from further consideration. These are:

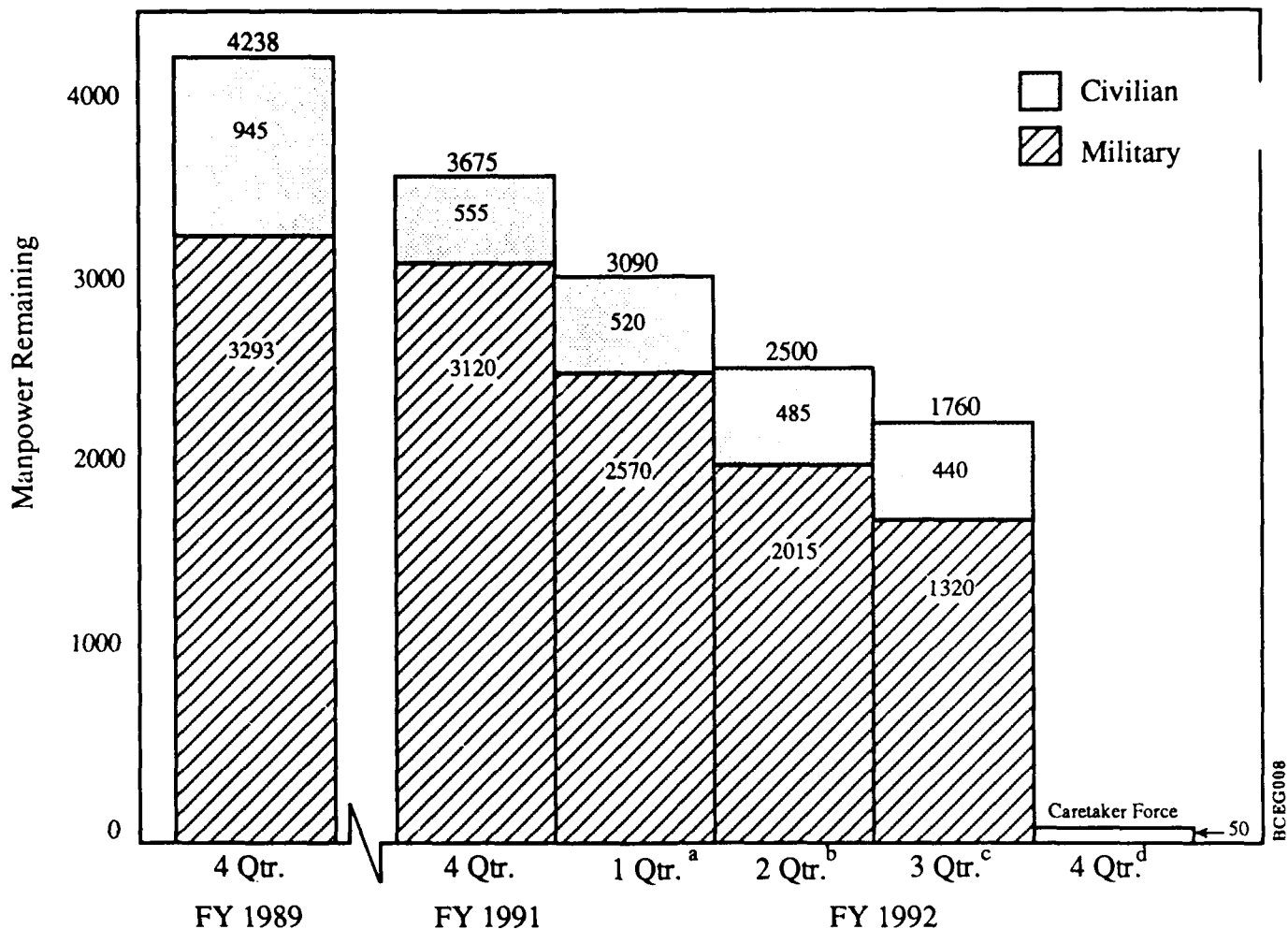
**Remove A-10s From Overseas Bases.** There are across-the-board drawdowns proposed for aircraft in Europe. These drawdowns are currently part of the Conventional Forces in Europe negotiations. These proposed reductions will be in addition to, not instead of, continental United States drawdowns. The strategic location of the A-10 squadron in Alaska eliminates it as a candidate for an alternate closure location.

**Remove A-10s From Bases in the Continental United States; Backfill the Bases With a New Mission.** Because of budget constraints and resultant force structure reductions, the time frames and dollars necessary to support a replacement mission at Myrtle Beach AFB, Davis-Monthan AFB or England AFB, will not be available. This, in addition to the military construction requirements for a new mission, precludes this alternative.

## **2.7 COMPARISON OF ENVIRONMENTAL IMPACTS**

### **2.7.1 Closure Actions**

A summary of changes to the local community, changes in hazardous materials management practices, and impacts to the natural environment is provided in the Summary. In addition, Table 2.7-1



**FIGURE 2.4-1 MANPOWER DRAWDOWN SCHEDULE FOR THE PROPOSED CLOSURE OF ENGLAND AFB, LOUISIANA<sup>e</sup>**

**Notes:**

- a. Inactivate: 74 TFS
- b. Inactivate: 75 TFS
- c. Inactivate: 76 TFS; 23 AGS; 23 EMS; 23 CRS; 1 CSG OLAP; DET 309, 3751 FTD
- d. Inactivate: 23 TFW; 23 ABOS; 23 CES; 23 CSG; 23 CPRS; 23 MED GP; 23 MSS; 23 SVCS; 23 SPS; 23 SUPS; 23 TRANS; 2400 RES RED MOB SQ; 22 COMBAT COMM OL-DJ; 1908 COMM SQ; AAFES; DET 210, AFCOMS; AF LEGAL SVC CTR; DET 5, 3 WS; DET 810, AFOSI
- e. Manpower authorizations represent end of quarter projections; caretaker force is estimated at 50 personnel.

Table 2.7-1

**Environmental Impacts Associated With Closure of  
Myrtle Beach AFB, Davis-Monthan AFB, and England AFB**

Resource Category	Impacts of Base Closure		
	Myrtle Beach AFB	Davis-Monthan AFB	England AFB
Geology and Soils	No impact on geologic resources. Reduced potential for soil contamination and disturbance.	No impact on geologic resources. Reduced potential for soil contamination and disturbance.	No impact on geologic resources. Reduced potential for soil contamination and disturbance.
Water Resources	Reduced contamination risk for surface and groundwater. Reduced groundwater use (550 million gallons/year). Minor positive impact on groundwater. Reduced wastewater flow (32% of current plant flow). Positive impact on water quality at effluent discharge point.	Reduced contamination risk for surface and groundwater. Reduced groundwater use (1.3 billion gallons/year). Minor positive impact on groundwater. Reduced wastewater flow (7.2% of current plant flow). Positive impact on water quality at effluent discharge point.	Reduced contamination risk for surface and groundwater. Reduced groundwater use (730 million gallons/year). Minor positive impact on groundwater. Reduced wastewater flow (13.6% of current plant flow). Positive impact on water quality at effluent discharge point.
Air Quality	Reduced (90%) base air pollutant emissions. Minimal positive impact to local air quality.	Reduced (75%) base air pollutant emissions. Minimal positive impact to local air quality.	Reduced (90%) base air pollutant emissions. Minimal positive impact to local air quality.
Noise	Offbase residential areas (195 acres) no longer exposed to $L_{dn}$ 65-75 dB. Remaining noise levels from Jetport operations do not exceed $L_{dn}$ 70 dB and are within base boundaries.	Offbase residential areas (980 acres) no longer exposed to $L_{dn}$ 65-75 dB. Remaining noise levels from aircraft activities would be minimal and within base boundaries.	Offbase residential areas (160 acres) no longer exposed to $L_{dn}$ 65-75 dB.
Biological Resources	Reduced disturbance of wildlife from base activities. Reduced quality of presently maintained wildlife habitat. No impacts on threatened and endangered species expected.	Reduced disturbance of wildlife from base activities. Reduced quality of presently maintained wildlife habitat. Impacts on threatened and endangered species expected unlikely.	Reduced disturbance of wildlife from base activities. No impacts on threatened and endangered species expected.
Cultural and Paleontological Resources	No expected impacts on cultural or paleontological resources. Five sites potentially eligible for the National Register of Historic Places (NRHP) would be maintained.	No expected impacts on cultural or paleontological resources. Six sites potentially eligible for the NRHP would be maintained.	No impacts on cultural or paleontological resources. No sites are eligible for the NRHP.

provides a summary of potential environmental impacts associated with closure actions at Myrtle Beach AFB, Davis-Monthan AFB, and England AFB. Detailed discussions are provided in Chapter 4.0, Environmental Impacts. Table 2.7-2 presents the Myrtle Beach, Davis-Monthan, and England AFB units and manpower proposed for closure and relocation.

A comparison of impacts to the natural environment associated with closure of Myrtle Beach AFB, Davis-Monthan AFB, and England AFB is provided below.

- **Geology and Soils** - There would be no effect on geology or available mineral resources at any of the bases. The potential for erosion, and soil contamination from accidental releases of hazardous substances, would be reduced.
- **Water Resources** - All three bases rely on local groundwater. Although the water table at Davis-Monthan AFB has dropped in recent years, the percent of local water use attributable to all three bases is so small that closure would have no significant effect on groundwater at any of the three locations. Closure of all of the bases would reduce treated wastewater effluent discharged to local rivers and would have a beneficial impact on water quality near the points of discharge.
- **Air Quality** - Reduced emissions from motor vehicles, aircraft, and other sources would have a minor beneficial impact on local air quality at all three bases.
- **Noise** - Aircraft and traffic noise would be reduced at all three bases. Residential areas at all three bases would no longer be exposed to day/night noise levels of 65 ( $L_{dn}$ ) to 75 decibels. The largest number of affected persons would be at Davis-Monthan AFB. Noise from aircraft operations would continue at Myrtle Beach AFB and Davis-Monthan AFB but at much reduced levels.
- **Biological Resources** - No significant impacts to vegetation or wildlife resources are expected at any of the bases. Disturbance of wildlife would be reduced at all three bases. At Myrtle Beach AFB, cessation of the habitat maintenance program would degrade wildlife habitat slightly. No threatened or endangered plant or animal species would be adversely affected.
- **Cultural and Paleontological Resources** - Although both Myrtle Beach AFB and Davis-Monthan AFB contain cultural resource sites potentially eligible for the National Register of Historic Places, closure would not disturb or otherwise affect cultural resources.

#### **2.7.2 No Action**

The no action alternative would not substantially affect the surrounding communities based on existing base operational and environmental conditions. Community population and employment would continue current trends. Land use and aesthetics at the bases would remain unchanged, at least for the near future. Transportation and utility patterns and trends would also remain unchanged. Local and state planning documents for utilities, transportation, and other service facilities, based on existing and projected future conditions, would continue to be valid and should adequately address potential growth-related impacts.

With the no action alternative, potential contamination due to storage, use, and disposal of hazardous materials/wastes at the bases would continue to be minimized by adhering to approved plans and applicable regulations. Hazardous materials would continue to be used at the bases in daily operational activities. Hazardous wastes would also be generated, collected, stored, and disposed of as currently directed by the base's respective Hazardous Waste Management Plans. Regulated underground storage tanks would continue to be inspected, maintained, monitored, tested, and

**Table 2.7-2**

**Unit Inactivations or Relocations  
Organized by Closure Location**

<b>Closure Location/Unit</b>	<b>Destination</b>	<b>Number of Aircraft (PAA)</b>	<b>Number of Personnel</b>	<b>Sorties/Year</b>
<b><u>Myrtle Beach AFB</u></b>				
73rd Tactical Control Squadron	Moody AFB, GA	None	11 O 74 E	None
Southwest Asia Fuels Mobility Support Equipment	MacDill AFB, FL	None	5 E	None
1816th Reserve Advisor Squadron	Langley AFB, VA	None	4 E	None
354th Tactical Fighter Wing	Retire, Sell, or Modernize Forward Air Control	72 A-10		
<b><u>Davis-Monthan AFB</u></b>				
602nd Tactical Air Control Wing	Holloman AFB, NM or Luke AFB, AZ	24 OA-10 6 OV-10	56 O 120 E 7 C	6,300 2,600
23rd Tactical Air Support Squadron	Holloman AFB, NM or Luke AFB, AZ	None	45 O 23 E	None
23rd Consolidated Aircraft Maintenance Squadron	Holloman AFB, NM or Luke AFB, AZ	None	11 O 536 E 2 C	None
41st Electronic Combat Squadron	Mt. Home AFB, ID or Holloman AFB, NM	9 EC-130	110 O 726 E 5 C	1,000
Detachment 2, Tactical Air Warfare Center	Mt. Home AFB, ID or Holloman AFB, NM	None	4 O 2 E 4 C	None

Table 2.7-2, Continued

Closure Location/Unit	Destination	Number of Aircraft (PAA)	Number of Personnel	Sorties/Year
<u>Davis-Monthan AFB</u> (Continued)				
120th Fighter Interceptor Group (ANG)	Luke AFB, AZ or remain at Davis-Monthan AFB, AZ	2 F-16	3 O 15 E	800
71st Special Operations Squadron Air Force Reserves	Luke AFB, AZ or remain at Davis-Monthan AFB, AZ	6 HH-3	54 C	600
Detachment 3, 12th AF Contingency Hospital	Luke AFB, AZ	None	2 C	None
923rd Civil Engineer Squadron (Air Force Reserves)	Luke AFB, AZ	None	2 C	None
355th Tactical Training Wing	Retire, Sell, or Modernize Forward Air Control	58 A-10		
<u>England AFB</u>				
23rd Tactical Fighter Wing	Retire, Sell, or Modernize Forward Air Control	72 A-10		

Notes: O = Officers  
E = Enlisted  
C = Civilians

removed in accordance with the applicable Underground Storage Tank Management Plans. The treatment, storage, and disposal facilities at the bases would continue to operate under their approved Resource Conservation and Recovery Act permits. Remediation of contaminated Installation Restoration Program sites will continue in accordance with approved plans.

The no action alternative would not substantially change existing environmental conditions for geology, soils, air quality, water resources, or noise in the area. However, reductions in air emissions and noise expected with the base to be closure proposed action would not be realized. At all three bases, residential areas would continue exposed to noise levels of  $L_{dn}$  65 to 75 dB. Any existing disturbance of wildlife by aircraft operations and other base activities would continue; this

disturbance is considered minor. The potential for loss or disturbance of natural habitat by future construction or other base activities would remain. Endangered species are unlikely to be affected if the bases remain open, primarily because no endangered species are known to occur on the bases. The possible exception is at Davis-Monthan AFB, where the Tumamoc globeberry (federally listed as endangered) and desert tortoise (candidate for federal listing) may occur. If these species occur onbase, they could be affected by future activities and construction in currently undeveloped areas of the base. If these species are found onbase, policies would be developed and implemented to prevent adverse impacts to these species from base activities. Protection and evaluation of prehistoric and historic sites, and progress toward nomination to the National Register of Historic Places of any eligible sites, would continue.

If Myrtle Beach AFB were to remain open, the 1990 Airport Revenue Bond issue would help finance expansion of the passenger terminal and other facilities at the Myrtle Beach Jetport. As described in Section 4.1.1.1, base closure may affect issuance of this bond as the Jetport may not be able to afford to service the bond debt and provide the services currently rendered to the Jetport by Myrtle Beach AFB. The bond issue supports terminal expansion from the present 55,000 square feet to approximately 150,000 square feet. A construction project at this site would have potential impacts on the natural and biological environment that are considered secondary impacts of the no action alternative. The total amount of disturbed area during construction would be approximately triple the area of expansion, or approximately 300,000 square feet. The resulting area of exposed soil would be subject to erosion unless erosion control measures were used diligently. Much of the area to be disturbed is currently paved, landscaped, or otherwise changed from its natural state. It is likely, however, that some of the mixed pine-hardwood forest surrounding the terminal, and the wildlife habitat provided by the forest, would be lost. No wetlands occur in the natural areas immediately surrounding the terminal. Construction equipment would emit air pollutants and exposed areas would be a source of fugitive dust. Construction equipment and activities would generate short-term noise, although it is doubtful that this would substantially increase average noise levels in nearby residential areas. Overall, the impacts associated with the Jetport expansion would be minor.

### **2.7.3 Relocation Actions**

Potential environmental impacts are expected to occur from the relocation of certain units to other receiving bases. Expected unit relocations and inactivations resulting from the proposed closure of Myrtle Beach AFB and the alternatives are shown in Table 2.7-3 and organized by receiving location.

***Myrtle Beach Air Force Base, South Carolina.*** Three Myrtle Beach AFB units are proposed for relocation and include the 73rd TCS (85 persons and 391 tons of equipment to Moody AFB, Georgia, in the fourth quarter of FY 1992), the Southwest Asia FMSE storage (5 personnel and 273 tons of equipment to MacDill AFB, Florida, in the first quarter of FY 1993), and the 1816th Reserve Advisor Squadron (4 personnel to Langley AFB, Virginia, in the fourth quarter of FY 1992). These relocations involve small numbers of personnel and movements and are therefore not expected to result in beneficial or adverse impacts to the natural environment at the receiving locations. Temporary minor impacts may result from the one-time movement of equipment from the FMSE storage at Myrtle Beach AFB to MacDill AFB in terms of increased air pollutant emissions as a result of traffic congestion. Transportation of equipment could be conducted at various times during the quarter and during periods of off-peak traffic volumes to minimize the potential for congestion, and consequently, air pollution. Operational impacts related to any of the three relocations are expected to be negligible. Inactivation of the 354th TFW would result in the retirement or sale of 72 A-10 aircraft and therefore, no relocation action is proposed. Some A-10 aircraft may be used to modernize the FAC force and be relocated to locations yet to be determined. No negative impacts are associated with the inactivation of the 354th TFW.

Table 2.7-3

**Unit Inactivations or Relocations  
Organized by Receiving Location**

<b>Receiving Location/Unit</b>	<b>Relocated From</b>	<b>Number of Aircraft (PAA)</b>	<b>Number<sup>1</sup> of Personnel</b>	<b>Sorties/Year</b>
<u>Holloman AFB, NM</u>				
602nd Tactical Air Control Wing	Davis-Monthan AFB	24 OA-10 6 OV-10	56 O 120 E 7 C	6,300 2,600
23rd Tactical Air Support Squadron	Davis-Monthan AFB	None	45 O 23 E	None
23rd Consolidated Aircraft Maintenance Squadron	Davis-Monthan AFB	None	11 O 536 E 2 C	None
41st Electronic Combat Squadron	Davis-Monthan AFB	9 EC-130	110 O 726 E 5 C	1,000
Detachment 2, Tactical Air Warfare Center	Davis-Monthan AFB	None	4 O 2 E 4 C	None
<u>Luke AFB, AZ</u>				
602nd Tactical Air Control Wing (if not Holloman AFB)	Davis-Monthan AFB	24 OA-10 6 OV-10	56 O 120 E 7 C	6,300 2,600
23rd Tactical Air Support Squadron (if not Holloman AFB)	Davis-Monthan AFB	None	45 O 23 E	None
23rd Consolidated Aircraft Maintenance Squadron (if not Holloman AFB)	Davis-Monthan AFB	None	11 O 536 E 2 C	None
120th Fighter Interceptor Group (ANG) <sup>2</sup>	Davis-Monthan AFB	2 F-16	3 O 15 E	800
71st Special Operations Squadron (Air Force Reserves) <sup>2</sup>	Davis-Monthan AFB	6 HH-3	54 C	600

Table 2.7-3, Page 2 of 2

Receiving Location/Unit	Relocated From	Number of Aircraft (PAA)	Number <sup>1</sup> of Personnel	Sorties/Year
<u>Luke AFB, AZ (Continued)</u>				
Detachment 3, 12th AF Contingency Hospital	Davis-Monthan AFB	None	2 C	None
923rd Civil Engineering Squadron (Air Force Reserves)	Davis-Monthan AFB	None	2 C	None
<u>Mountain Home AFB, ID</u>				
41st Electronic Combat Squadron (if not Holloman AFB)	Davis-Monthan AFB	9 EC-130	110 O 726 E 5 C	1,000
Detachment 2, Tactical Air Warfare Center (if not (Holloman AFB)	Davis-Monthan AFB	None	4 O 2 E 4 C	None
<u>Moody AFB, GA</u>				
73rd Tactical Control Squadron	Myrtle Beach AFB	None	11 O 74 E	None
<u>MacDill AFB, FL</u>				
Southwest Asia Fuels Mobility Support Equipment	Myrtle Beach AFB	None	5 E	None
<u>Langley AFB, VA</u>				
1816th Reserve Advisor Squadron	Myrtle Beach AFB	None	4 E	None
<u>Retire, Sell, or Modernize Forward Air Control</u>				
354th Tactical Fighter Wing	Myrtle Beach AFB	72 A-10		
355th Tactical Training Wing	Davis-Monthan AFB	58 A-10		
23rd Tactical Fighter Wing	England AFB	72 A-10		

Notes: <sup>1</sup>O=Officers, E=Enlisted, C=Civilians<sup>2</sup>May remain at Davis-Monthan AFB, Arizona.

**Davis-Monthan Air Force Base, Arizona.** Seven Davis-Monthan AFB units are proposed for relocation to candidate receiving bases. Three of the seven units include the 602nd TAIRCW (183 personnel, 24 OA-10 aircraft, 6 OV-10 aircraft) and its two subordinate units, the 23rd Tactical Air Support Squadron (68 personnel) and the 23rd Consolidated Aircraft Maintenance Squadron (549 personnel and associated equipment). The relocation of these three units to Holloman AFB, New Mexico, or Luke AFB, Arizona, during the third quarter of FY 1992 would involve the transfer of approximately 800 personnel and result in an estimated yearly sortie rate of 6,300 OA-10 aircraft operations and 2,600 OV-10 aircraft operations.

Personnel increases at the receiving locations would result in greater demands for water, wastewater treatment, solid waste disposal, and energy (electrical and natural gas); however, these demands are not expected to have an impact on existing utility systems at either Holloman AFB or Luke AFB. No unusual volumes and types of hazardous wastes are likely to be involved with the operation and maintenance of the OA-10 and OV-10 aircraft. The handling and storage of hazardous materials and the disposal and storage of hazardous wastes would be in accordance with existing hazardous material/waste management plans and procedures at either of the locations. Therefore, the potential for soil and water contamination as a result of aircraft and support operations is very low.

The transportation of personnel, equipment, and material to either destination would result in short-term air emission increases (carbon monoxide, nitrogen oxides, and hydrocarbons) from transport vehicles and possible congestion as a result of the movements. Once the 602nd TAIRCW and its two units are relocated, aircraft and vehicle emissions would increase on and around the base. Aircraft emission increases would be small considering the low number of yearly sorties. In addition, OA-10 and OV-10 aircraft engines generate low amounts of pollutant emissions in terms of particulates, carbon monoxide, nitrogen oxides, sulfur oxides, and hydrocarbons. Levels of air emissions associated with the relocation are not expected to affect the attainment status of the region nor violate state or National Ambient Air Quality Standards for criteria pollutants. Areas currently in nonattainment status for certain criteria pollutants are not expected to be affected as current technologies and regulatory standards are in effect throughout the region to reduce air emissions. Air Force actions would be in compliance with pertinent federal air quality regulations.

Noise levels associated with the operation of OA-10 and OV-10 aircraft are low. The addition of expected aircraft operations and associated maintenance support activity would not noticeably increase existing noise levels at either destination because current flight operations and aircraft noise are far greater.

Relocation of the 602nd TAIRCW and its two units is not expected to have adverse impacts on biological or cultural resources at either Holloman AFB or Luke AFB. Construction activity associated with the beddown of these units may result in minor disturbance impacts to biological resources and would be coordinated with appropriate natural resource offices and agencies. The potential exists for cumulative impacts at Luke AFB should it receive the 602nd TAIRCW mission from Davis-Monthan AFB and the 12th Air Force Headquarters and other 602nd TAIRCW units from Bergstrom AFB, Texas. This potential cumulative action would result in the relocation of approximately 1,600 personnel, 24 OA-10 aircraft, 6 OV-10 aircraft, and associated equipment. The cumulative action would increase utility demand, waste generation, air emissions, noise levels, and construction activity, however some of these are expected to result in substantial adverse impacts to the environment.

Two additional Davis-Monthan AFB units proposed for relocation include the 41st Electronic Combat Squadron (841 personnel, 9 EC-130 aircraft) and a support unit, Detachment 2, Tactical Air Warfare Center (10 personnel). The relocation of these two units to either Mountain Home AFB, Idaho, or Holloman AFB, New Mexico, during the first quarter of FY 1993 would involve the transfer of

approximately 850 personnel and result in an estimated yearly sortie rate of 1,000 EC-130 aircraft operations. Personnel increases at the receiving locations would create demands on existing utility systems (particularly if Holloman AFB is selected as the receiving location for the 602nd TAIRCW); however, it is not expected to significantly burden current utility operations. No unusual volumes or types of hazardous waste are likely to be involved with the operation and maintenance of the EC-130. Soil and water contamination risks as a result of aircraft and support operations associated with the relocation are minor. Air pollution emissions would increase in the short term due to the initial transportation of personnel and equipment, and in the long term due to the immigration of personnel and vehicles. Air quality and noise impacts as a result of aircraft operations are expected to be negligible due to the small amount of sorties and quiet turboprop engines on the EC-130. Relocation of the 41st ECS and its support unit is not expected to have adverse impacts on biological and cultural resources. Construction activity associated with the beddown of these units may result in minor disturbance impacts to biological resources. The potential exists for cumulative impacts at Holloman AFB should it receive both the 41st ECS and 602nd TAIRCW missions from Davis-Monthan AFB. This potential cumulative action would result in the relocation of approximately 1,650 personnel, 24 OA-10 aircraft, 9 EC-130 aircraft, 6 OV-10 aircraft, and associated equipment. The cumulative action would increase utility demand, waste generation, air emissions, noise levels, and construction activity; however, none of these are expected to result in substantial adverse impacts to the environment.

The Air Force is also considering the beddown of 46 F-117 aircraft, 8 AT-38 aircraft, and related personnel and equipment to Holloman AFB in the third quarter of FY 1992. The impacts associated with this action would be cumulative with those resulting from the unit relocations at Holloman AFB.

The two final Davis-Monthan AFB units proposed for relocation include the 120th Fighter Interceptor Group (45 personnel, 2 F-16 aircraft) of the Montana Air National Guard and the 71st Special Operations Squadron (54 personnel, 6 HH-3 helicopters). The relocation of the 120th Fighter Interceptor Group (FIG) to Luke AFB, Arizona, during the first quarter of FY 1993 would involve an estimated yearly sortie rate of 800 F-16 aircraft operations. The relocation of the 71st Special Operations Squadron (SOS) to Luke AFB, Arizona, during the fourth quarter of FY 1992 would involve an estimated yearly sortie rate of 600 HH-3 helicopter operations. The magnitude of personnel and aircraft operations associated with these two relocations is minor and minimal impacts to the physical environment (soil, air, water, biological, and cultural resources) are expected. These actions would contribute to cumulative impacts if single or multiple missions (previously identified) are to be based at Luke AFB. Air quality and noise impacts resulting from aircraft/helicopter operations would not substantially increase existing conditions at Luke AFB. Relocations at the 120th FIG and 71st SOS involve approximately 72 personnel and would result in minimal impacts at Luke AFB. It is possible for the 120th FIG and 71st SOS units to remain in operation at Davis-Monthan AFB, if not relocated to Luke AFB.

Inactivation of the 355th TTW at Davis-Monthan AFB would result in the retirement or sale of 58 A-10 aircraft and therefore no relocation action is proposed. Some A-10 aircraft may be used to modernize the FAC force and be relocated to locations yet to be determined. No negative impacts to the natural environment are associated with the inactivation of the 355th TTW.

**England Air Force Base, Louisiana.** No units at England AFB are proposed for relocation. Inactivation of the 23rd TFW at England AFB would result in the retirement or sale of 72 A-10 aircraft and therefore no relocation of aircraft is proposed. Some A-10 aircraft may be used to modernize the FAC force and be relocated to locations yet to be determined. No negative impacts to the natural environment are associated with the inactivation of the 23rd TFW.

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### **3.0           AFFECTED ENVIRONMENT**

As required by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA), the focus of this Environmental Impact Statement (EIS) is on evaluation of environmental impacts of base closure. To provide the context in which impacts to the environment may occur, discussions of installation background and existing baseline conditions in the local community, including population, land use and aesthetics, transportation, and community utility services, are included in this chapter. In addition, current methods of handling and management of hazardous waste and other materials are discussed. Finally, existing conditions in the natural environment are discussed for geology and soils, water resources, air quality, noise, biological resources, and cultural and paleontological resources.

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### **3.1**

### **MYRTLE BEACH AIR FORCE BASE, SOUTH CAROLINA**

Myrtle Beach Air Force Base (AFB) was activated as the Army Air Corps Airfield in June 1940. The field served as a firing, gunnery, and bombing range. On December 7, 1941, the 112th Observation Squadron was deployed at the base to defend the coastline. The 79th Fighter Squadron began gunnery training in May 1942, and 11 months later (4,451 bombing missions later) the 17th, 31st, 310th, 323rd, and 345th Bombardment groups were training there. The base was designated Myrtle Beach Army Field on November 8, 1943, and, when the war ended, it housed the National Guard, Civil Air Patrol, and U.S. Military Academy organizations. On November 1, 1947, the expedient demobilization of the Armed Forces forced closure of the base, which was turned over to the City of Myrtle Beach to serve as a municipal airport.

On May 8, 1954, the Myrtle Beach Municipal Airport was offered to the Air Force by city officials. The 727th Aircraft Control and Warning Squadron then occupied the base. Soon after, the 4434th Air Base Squadron attained housekeeping unit status until July 25, 1956, when it was replaced by the 342nd Fighter Day Wing. The 342nd Fighter Day Wing was then inactivated in November 1956, and the 354th Fighter Day Wing took over the installation. On July 1, 1958, the Fighter Wing became a Tactical Fighter Wing (TFW). Since 1958, the 354th TFW has served as the host unit of Myrtle Beach AFB, with the exception of two periods of overseas deployment. Between April 1968 and June 1970, the 354th TFW was transferred to Kusan Air Base in Korea. During this time, the 113th TFW took over control of the base. Between October 1972 and May 1974, the wing was deployed to Korat Royal Thai AFB, Thailand.

During its first years as host at Myrtle Beach AFB, the 354th TFW was equipped with F-100D fighter aircraft. From 1970 to 1972, the wing transitioned to the new A-7D Corsair II tactical fighter. In 1977 and 1978, the A-7D aircraft were transferred to Air National Guard units, and the 354th TFW was equipped with A-10A Close Air Support Aircraft, which the wing still operates today.

On July 9, 1975, joint military and civilian use of the Myrtle Beach AFB runway commenced with the formal opening of Piedmont Airlines terminal facilities on the northeast side of the base. Today, Myrtle Beach Jetport, served by several commercial airlines, continues to share use of Myrtle Beach AFB's runway. The Horry County Department of Airports is currently planning an \$11 million bond issue (1990 Airport Revenue Board Issue) to finance expansion of the passenger terminal and other facilities at the Jetport.

#### **3.1.1**

#### **Local Community**

Myrtle Beach AFB is within the city limits of Myrtle Beach in southeastern Horry County, South Carolina. The base is bordered by U.S. 17 and U.S. 17 Business, and lies within the Grand Strand, a popular beach resort area extending from the North Carolina border south to Georgetown, South Carolina. Communities within the vicinity of the base include North Myrtle Beach, Atlantic Beach, Surfside Beach, Garden City, Murrells Inlet, Socastee, and Conway (Figures 3.1.1-1 and 3.1.1-2).

The Myrtle Beach area experiences warm temperate climatic patterns which are moderated by the maritime effects of the Atlantic Ocean. The weather is typical of subtropical humid zones, with hot summers and mild winters. The mean annual temperature is approximately 64°F, with summers averaging 79°F and winters averaging 47°F. Annual precipitation averages 49.5 inches, the majority of which falls from June through September. Snowfall is rare and usually of short duration. Prevailing winds are from the south-southwest, with highest wind speeds in the summer, averaging 10 miles per hour. Hurricane season is primarily from August through November, although hurricanes may occur throughout the year.

The Myrtle Beach area is within the Sea Island subdivision of the Atlantic Coastal Plain Physiographic Province. The region is characterized by relatively flat-lying topography and northeast-southwest

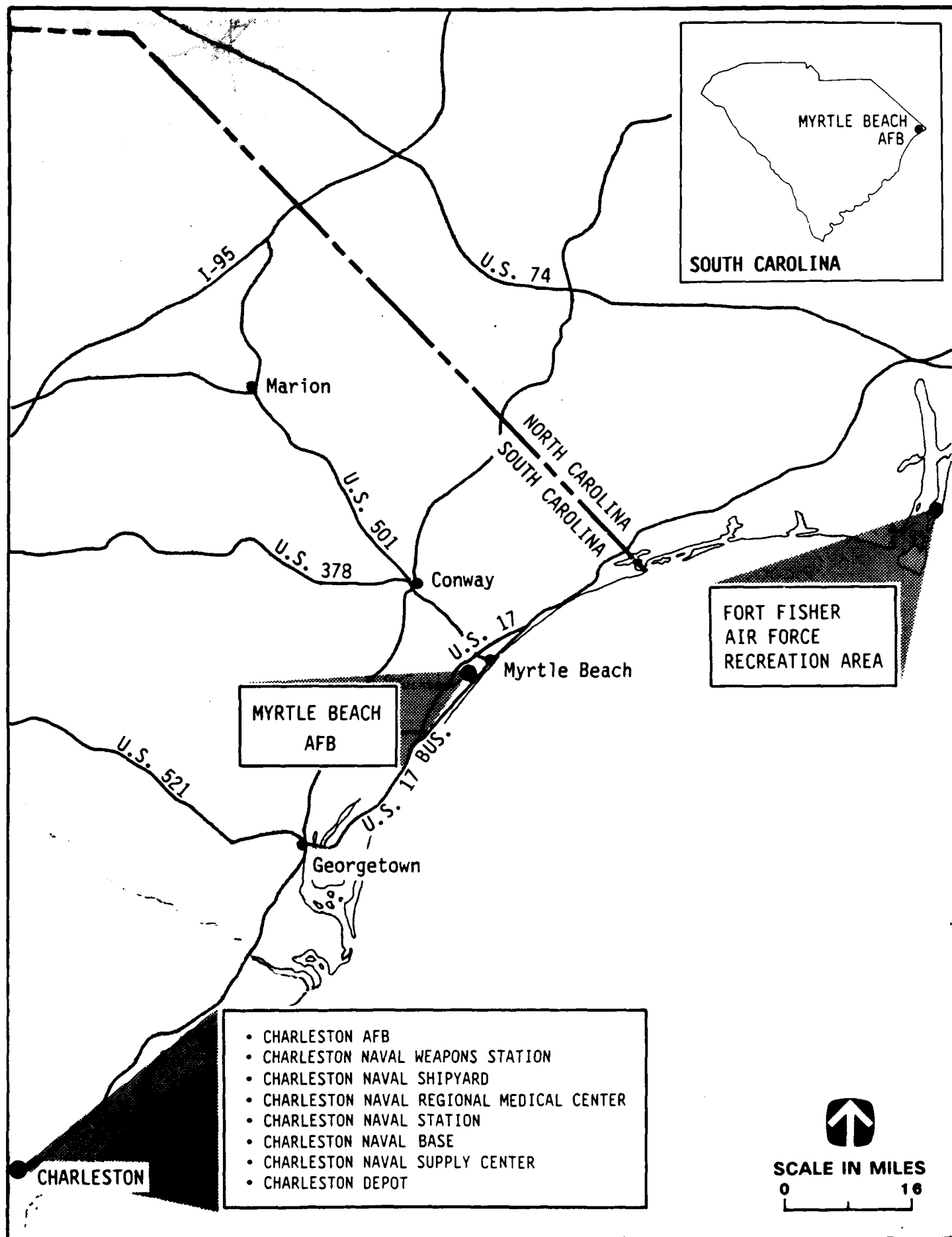


FIGURE 3.1.1-1 REGIONAL SETTING, MYRTLE BEACH AFB, SOUTH CAROLINA

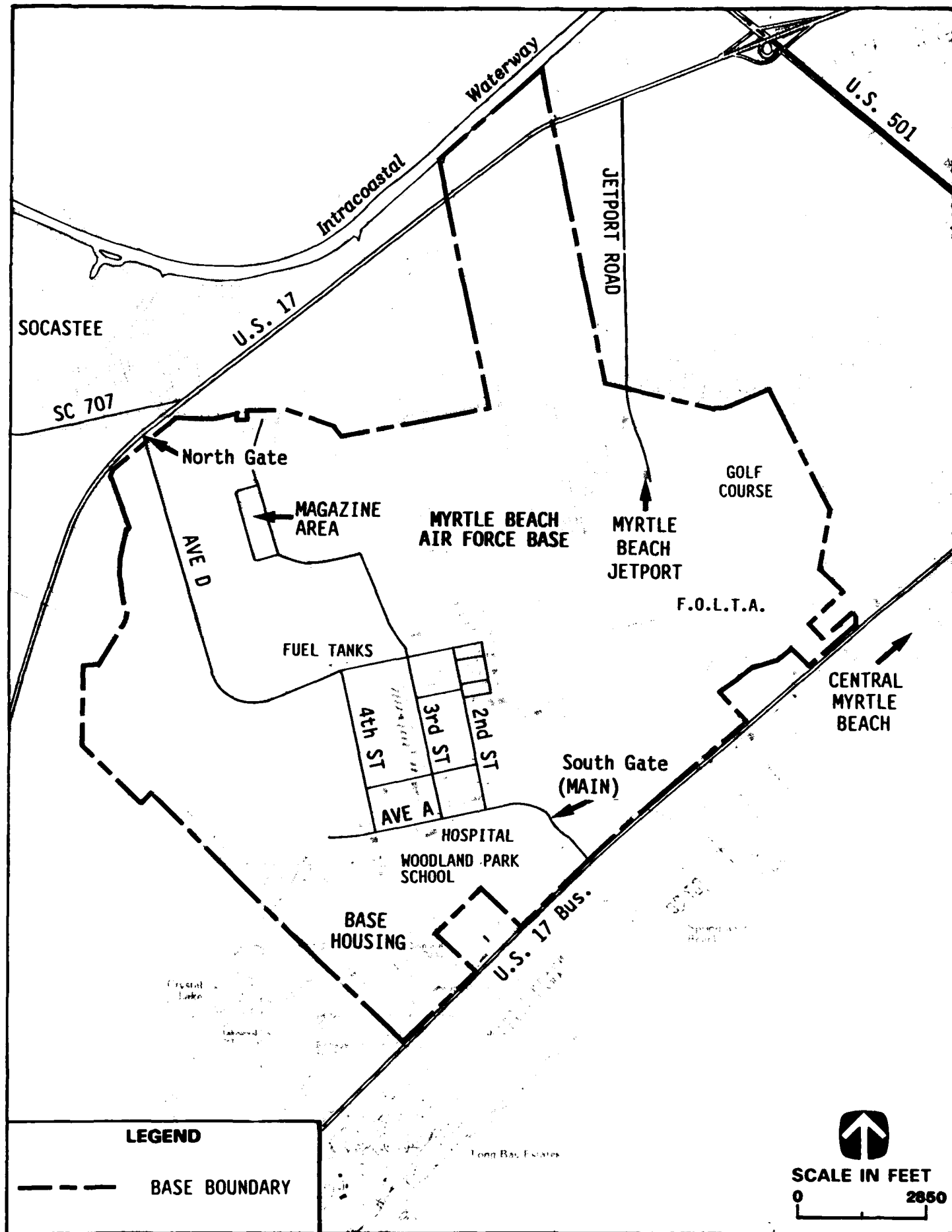


FIGURE 3.1.1-2 MYRTLE BEACH AFB, SOUTH CAROLINA AND VICINITY

trending terraces separated by ridges and wave-cut scarps. Elevations range from mean sea level (MSL) to a maximum of approximately 30 feet.

#### **3.1.1.1 Community Setting**

At the end of fiscal year (FY) 1989, Myrtle Beach AFB employed a total of 3,264 military personnel (302 officers and 2,962 enlisted), 483 appropriated fund civilian personnel, and 460 other civilian personnel (ERIS 1989). Approximately 55 percent of the military personnel live onbase, and 45 percent live in communities near the base. The base population is 4,201, which consists of the military personnel and their dependents who live onbase. Approximately 4,200 military retirees live in the base vicinity. In addition to direct employment of civilians on the base, spending by the base and base employees provides secondary employment for approximately 1,600 other civilians in the local area.

Independent of base closure, personnel authorizations will change over the next several years. By the first quarter of FY 1992, military authorizations will increase slightly to 3,270 military personnel (310 officers and 2,960 enlisted), while civilian personnel authorizations will decrease to 680. The actual numbers of personnel will probably be slightly lower than the authorizations. By FY 1992, secondary employment is projected to be 1,468.

The population of Myrtle Beach and Horry County fluctuates greatly due to the influx of tourists during the summer months, but estimates of permanent population for these areas are approximately 30,000 and 156,800 for Myrtle Beach and Horry County, respectively (ERM 1990). During peak vacation periods, the Grand Strand area's population swells to nearly 500,000. The Myrtle Beach area has seen significant population growth over the past few decades as the area's economy has changed from one based on agricultural to one founded on industry, tourism, and services. Projections call for the population of Myrtle Beach to reach 32,200 by the year 2000, while Horry County is expected to reach a population of 225,800 in the year 2000, a 3-percent average annual growth rate over the next 10 years.

Myrtle Beach AFB is the single largest employer in Horry County. Tourism is the largest private-sector employer in the county, providing 33,000 jobs. Construction and manufacturing employs 6,500 people, while 4,000 are working in the agricultural and wood product industries. The seasonal nature of employment in the tourism industry makes it difficult for Myrtle Beach to develop a stable and skilled labor force. Permanent employment in the area mainly consist of skilled professional and administrative workers. The predominance of the tourism industry, infrastructure deficiencies, and a largely seasonal and rural labor force all acted to inhibit development of the manufacturing sector.

Nearly 80 percent of the job openings in the Grand Strand area are filled by workers from Horry County. Projections call for employment to grow by 5.5 percent a year for the next 15 years. The sectors expected to see the greatest growth over the next decade are retail and services, which could account for 65 percent of nonagricultural employment by the year 2007.

#### **3.1.1.2 Land Use and Aesthetics**

**Land Use.** As part of the Grand Strand, the Myrtle Beach area has diverse land uses. The city has adopted a comprehensive plan and zoning ordinance; however, the base is exempt from their provisions. Although commercial and residential development dominate the Grand Strand region, the largest proportion of the area is undeveloped. In contrast, the area within the city limits is intensely developed.

Figure 3.1.1-3 shows existing land use on Myrtle Beach AFB and in the surrounding area. Myrtle Beach AFB covers approximately 3,793 acres, 1,150 acres of which are unimproved woodland or

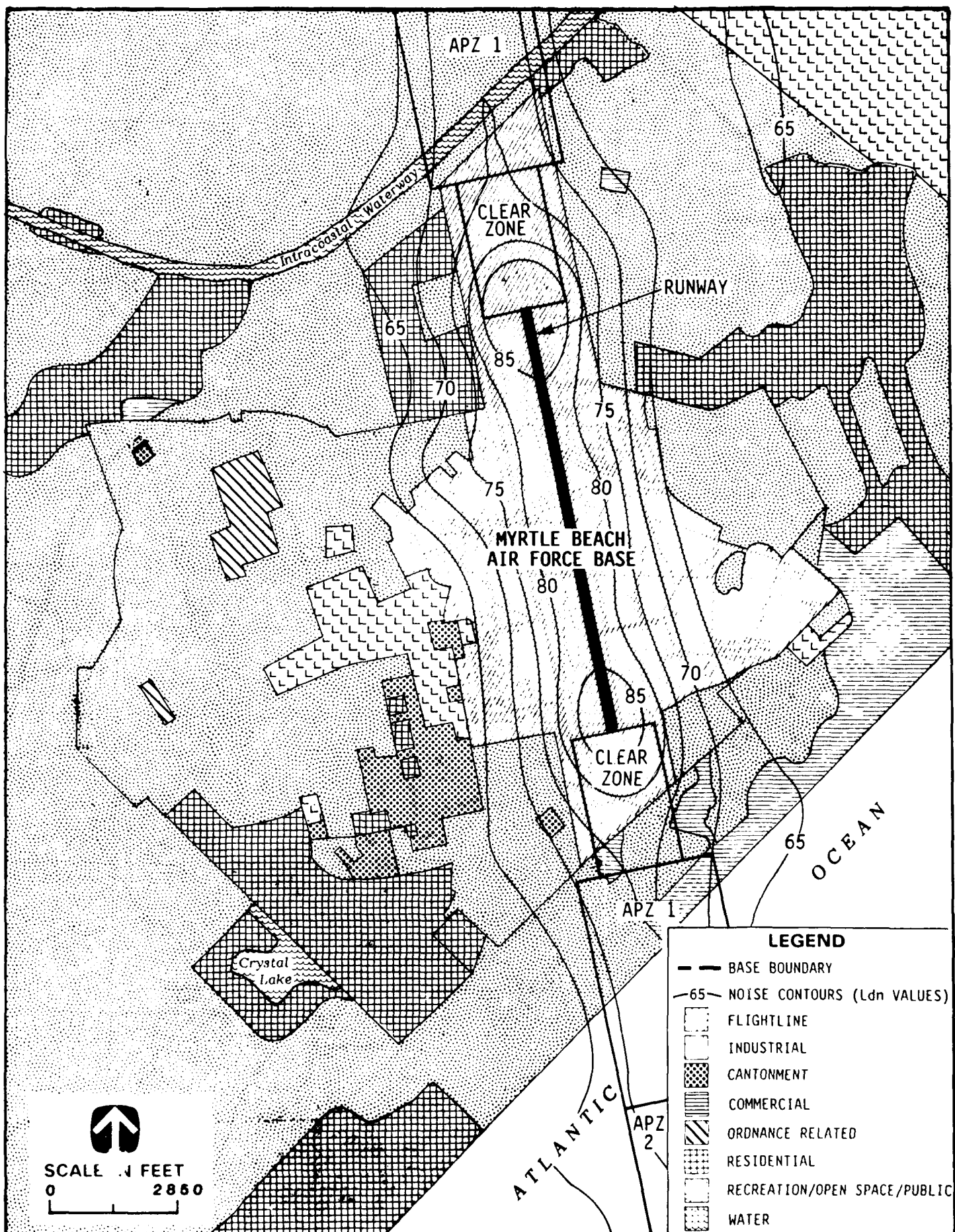


FIGURE 3.1.1-3 EXISTING LAND USE, NOISE CONTOURS, AND AIRCRAFT ACCIDENT POTENTIAL ZONES, MYRTLE BEACH AFB, SOUTH CAROLINA AND VICINITY

shrubs. Runways, taxiways, aprons, and other airfield features make up 1,038 of the improved acres. An additional 515 acres contain hangars, offices, and other buildings. Another 1,090 acres, adjacent to the runways and between improved and unimproved lands, are kept in a semi-improved state; that is, native vegetation is controlled and maintained.

Land use surrounding Myrtle Beach AFB is predominantly commercial, residential, and undeveloped. Adjacent to the base along U.S. 17 and U.S. 17 Business are irregularly developed commercial properties. North and south of the base are residential communities mixed with some commercial development. Directly east of the base is Myrtle Beach State Park, and the Atlantic Ocean is less than 0.5 mile from the base perimeter. In contrast to the land development within the City of Myrtle Beach, land to the west and northeast is relatively undeveloped and consists primarily of woodland.

Future land use, environmental and development constraints, and goals and objectives of the Capital Improvements Program are contained in the *Commander's Long Range Facility Improvement Plan*, which is designed to provide policy guidelines for future base development and facility siting.

The goals and objectives of the Myrtle Beach area are identified in the 1979 *Comprehensive Plan for the Myrtle Beach Area*. Areas adjacent to the base outside the Myrtle Beach city limits are controlled by the 1983 Horry County Land Use Plan.

The South Carolina Coastal Zone Management Act (CZMA) regulates development and environmental conditions along South Carolina's coastline. The coastal zone defined by the CZMA extends inland to the inland boundary of all coastal counties (including Horry County). Under the federal CZMA of 1972, all federal actions, such as those of Myrtle Beach AFB, must be as consistent as practicable with state CZMAs. Presently, surface water runoff from Myrtle Beach AFB is permitted under the South Carolina CZMA stormwater management guidelines.

Zoning regulations for Myrtle Beach AFB and some of the surrounding area are controlled by the City of Myrtle Beach. The base is zoned C-10 (military district). This zone is intended to provide a military/light industrial district within the city, where military land uses and their related support activities can be accommodated without being affected or affecting unrelated land uses. Most of the land surrounding the base lies within Horry County. Figure 3.1.1-4 shows city and county zoning in the vicinity of Myrtle Beach AFB.

The Air Force makes recommendations for appropriate land uses in aircraft hazard zones and noise zones around Air Force bases through its Air Installation Compatible Use Zone (AICUZ) program. An AICUZ study involves an analysis of land use compatibility around a military airfield in terms of noise accident potential, and other factors such as physical obstructions to flight, types of human activities, density of houses, and concentration of persons unable to help themselves (i.e., handicapped, elderly, and infants). As a result of an AICUZ study, noise contours and Accident Potential Zones (APZs) become the criteria for recommended land use. Recommendations for land use around an airfield are then made available by the Air Force to the civilian authorities with the purpose of promoting zoning and other types of regulations that can effectively control undesirable growth around the airfield. For example, a day/night sound level ( $L_{dn}$ ) higher than 75 decibels (dB) is considered incompatible with residential land use. A designation of APZ 1 is considered to be compatible with industrial/manufacturing, open space, recreation, and other uses that do not concentrate people in small areas. The APZ 2 designation is considered compatible with the same uses as APZ 1 as well as low-density single-family residential, business, and commercial retail uses. Buildings for most nonresidential uses should be limited to one story.

No development is recommended in the Clear Zone at the end of each runway (Figure 3.1.1-3); therefore, the commercial recreational development in Myrtle Beach AFB's south Clear Zone is incompatible with Air Force recommendations. The Springmaid Beach resort area, which includes

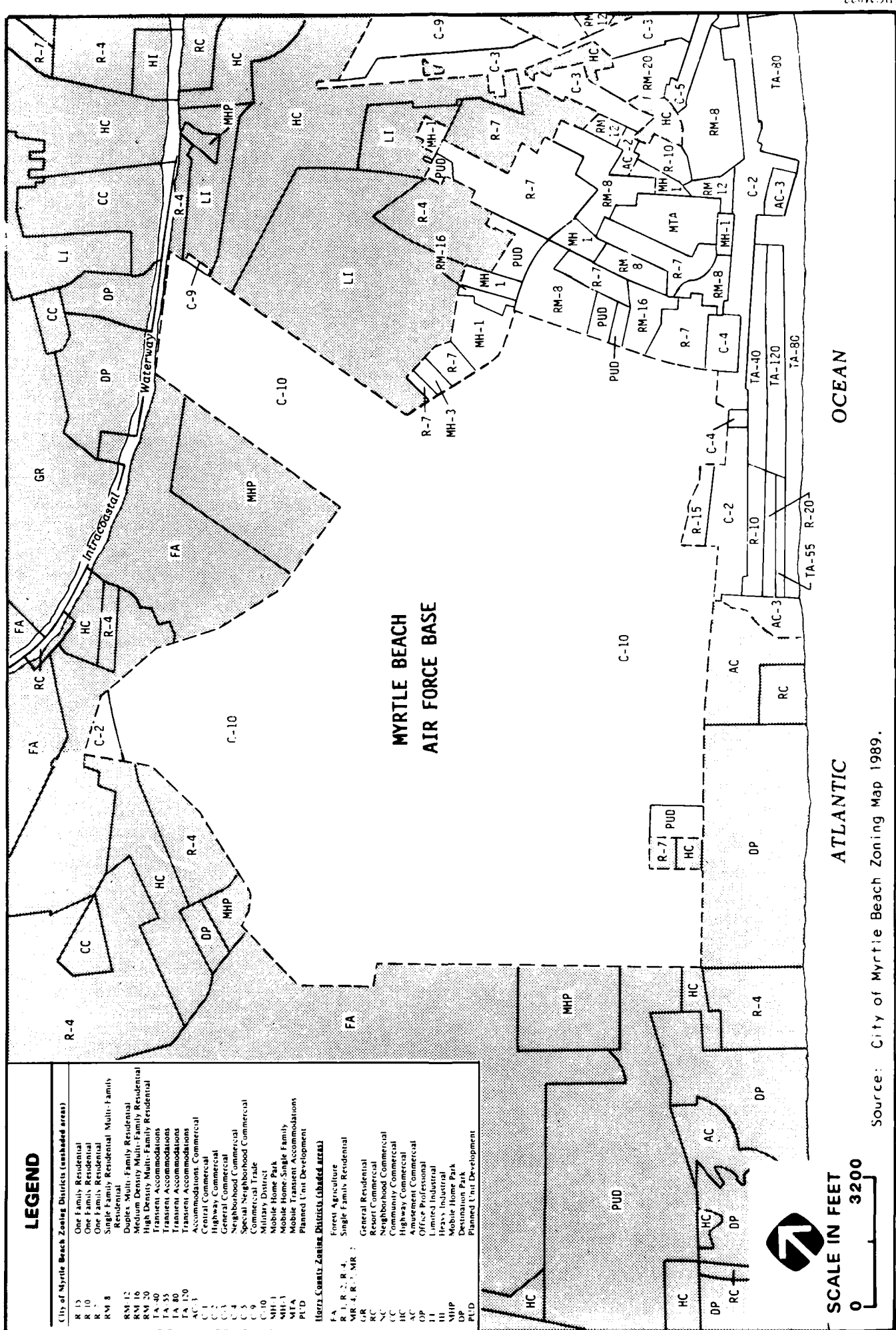


FIGURE 3.1.1-4 EXISTING ZONING, MYRTLE BEACH AFB, SOUTH CAROLINA AND VICINITY

lodging facilities, is located in the south APZ 1 and is also incompatible with Air Force recommendations. However, 93 percent of the area in the south Clear Zone and APZs is in compatible use. In the north Clear Zone and APZs, essentially all uses are compatible with Air Force recommendations. The only exception is a restaurant in north APZ 2. Compatible uses in the north zones include U.S. 17 and the Intracoastal Waterway, located in north APZ 1, and the commercial and industrial areas along U.S. 501 in north APZ 2. Residential areas west and east of the northern end of the runway (Figure 3.1.1-3) lie within the  $L_{\text{dn}}$  65 and 75 dB noise levels. The Air Force discourages residential use within areas exposed to  $L_{\text{dn}}$  65 dB or greater. The existing noise environment near Myrtle Beach AFB is discussed further in Section 3.1.3.4. The City of Myrtle Beach and Horry County have adopted Air Force recommendations regarding limits on heights of structures and natural objects near Air Force bases, but recommendations regarding aircraft hazard zones and noise levels have not been incorporated.

**Aesthetics.** The visual attributes of the Myrtle Beach area are fairly typical of Atlantic coastal communities. The northern part of the South Carolina coast, which includes Horry County and part of northern Georgetown County, borders on Long Bay and contains comparatively fewer salt marshes, estuaries, and barrier islands than the other coastal regions. The Horry County section, including the Myrtle Beach planning area, is dominated by broad sandy beaches that are interrupted by small tidal creeks and swashes. Numerous tree species predominate in the Myrtle Beach area which, as an aesthetic feature, act to beautify developed and undeveloped land. Examples of prevalent trees are live oak, pine, southern magnolia, willow oak, sweetgum, blackgum, wild cherry, pecan, and dogwood. The city is named for the southern waxmyrtle, a native evergreen shrub with fragrant berries and flowers. Of special importance are the types of vegetation found along the beaches and in wetland areas. Not only do these plants play an ecological role in maintaining the natural environmental balance, they also contribute to the visual aesthetics of the community.

The visual features of Myrtle Beach AFB match those of the surrounding community well. Landscaping is well maintained, and plentiful water allows the maintenance of large grassy areas. Trees, including pine, magnolia, and live oak, are abundant throughout the developed area of the base. Much of the base is forested and undeveloped. The majority of the base buildings are block type and painted in light earth tones.

### 3.1.1.3 Transportation

**Transportation Systems.** The principal roadways serving Myrtle Beach AFB and vicinity are shown on Figure 3.1.1-5. U.S. 17 Business provides access to the Main Gate/Visitors Center (South Gate) entrance. U.S. 17 provides access to the North Gate, as does State Highway 707, which merges with U.S. 17 from the west near the North Gate. The Main Gate and North Gate intersections are signalized. Other principal highways in the study area include U.S. 501 and State Highway 544 located north and south of Myrtle Beach AFB, respectively. Jetport Road provides access to the Jetport from Highway 17 at a T intersection controlled by a stop sign on Jetport Road.

Commercial air passenger and cargo services are provided to the Myrtle Beach area through the Myrtle Beach Jetport, which shares the Myrtle Beach AFB runway. The Jetport is served by four commercial passenger airlines, three cargo airlines, and various charter companies (infrequently). General aviation facilities in the area include the Grand Strand Airport in North Myrtle Beach, and the Conway-Horry County Airport 4 miles west of the City of Conway (Figure 3.1.1-6).

Rail service to Myrtle Beach is provided by Waccamaw Coastline Railroad Company. This railroad currently provides only freight service. Mid Atlantic Railroad operates a rail line from Chadborn, North Carolina, to Conway, South Carolina, where Waccamaw Coastline operates the rail service to Myrtle Beach. Myrtle Beach AFB does not utilize this railway service, and the railway would not be used for any closure-related transportation.

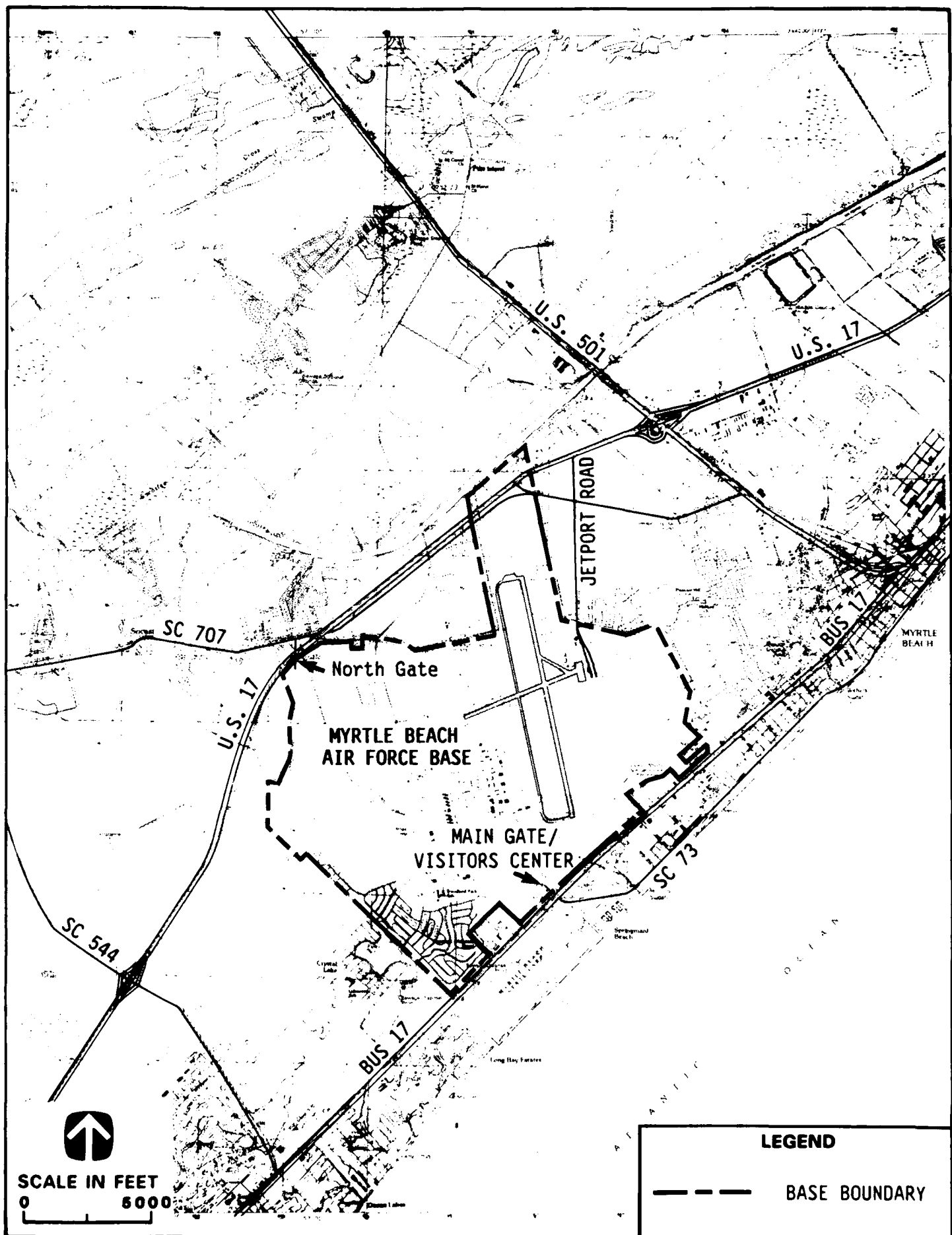
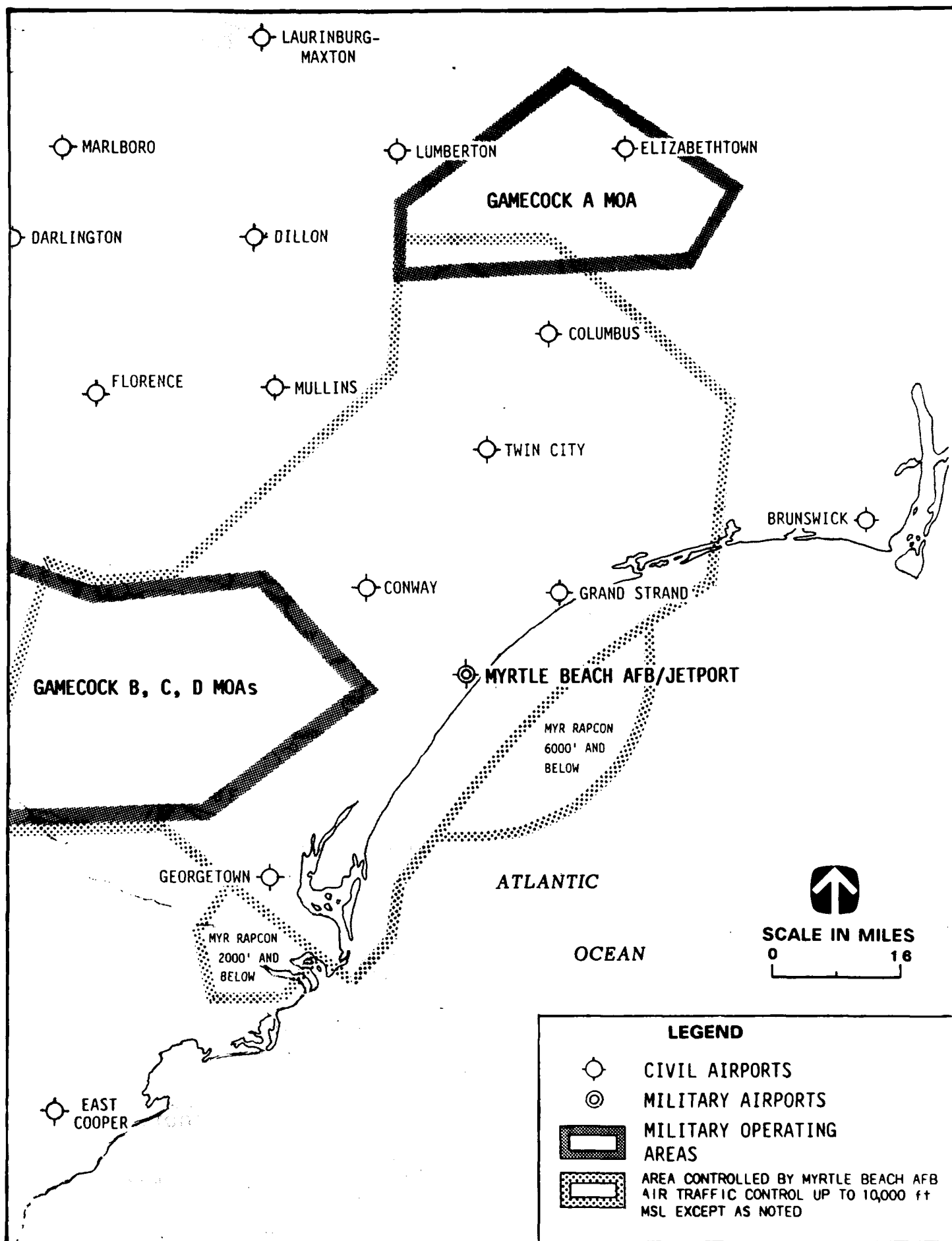


FIGURE 3.1.1-5 PRINCIPAL ROADWAYS SERVING MYRTLE BEACH AFB, SOUTH CAROLINA



**FIGURE 3.1.1-6 AIRPORTS AND AIRSPACE SURROUNDING MYRTLE BEACH AFB, SOUTH CAROLINA**

**Ground Traffic.** Traffic volumes for the principal roadways serving the Myrtle Beach AFB area are shown in Table 3.1.1-1. Traffic volume is presented as average annual daily traffic (AADT), defined as the total volume passing a point or segment of a highway facility, in both directions, for 1 year, divided by the number of days in the year (Transportation Research Board 1985). Traffic analysis, including calculation of volume-to-capacity ratios and level of service (LOS), normally focuses on peak traffic hours. Data on peak-hour traffic volumes are not available for the project area. Therefore, the peak hourly traffic flow has been estimated from AADT. A peak hour factor of 10 percent of AADT was chosen as this is a reasonable approximation of peak hourly volume. Capacity has been expressed as the theoretical maximum volume of traffic that pass a given point under ideal conditions (no weather constraints, level roadway, and adequate design speed). Theoretical capacity has been estimated at 2,000 vehicles per lane per hour (Transportation Research Board 1985). U.S. 501 between State Route 992 and U.S. 17 is estimated to operate at LOS C during the peak hour. All other roadways operate at LOS A or B. As can be seen from the table, current average volume is well below maximum capacity on all roadways. Normally, traffic flows freely on these roadways. Occasional congestion occurs within the vicinity of the Main Gate and North Gate during morning and afternoon peak hours. Heaviest traffic flow is experienced during summer weekends and holidays, causing extensive traffic jams along U.S. 501.

Based on the base's population, it is estimated that Myrtle Beach AFB generates approximately 9,300 vehicle trips per day. Assuming a 60/40 Main Gate/North Gate split, base-related traffic contributes approximately 5,600 vehicle trips (19%) to total daily traffic on U.S. 17 Business at the Main Gate, and approximately 3,700 vehicle trips (10%) to total daily traffic on U.S. 17 at the North Gate.

**Air Traffic.** Myrtle Beach AFB is a joint use facility in which land is leased to the Myrtle Beach Jetport, a commercial aviation airport. Under an existing joint use agreement, civil aircraft operations are permitted on the Myrtle Beach AFB runway provided that these operations do not conflict with military use. The Myrtle Beach AFB airfield contains a single 9,500-foot runway with a north-south (17/35) orientation, approximately 370,683 square yards of ramp/apron area, a navigational and instrument flight system (Radar Approach Control facility), control tower, and related utilities. The Myrtle Beach Jetport consists of 55,000 square feet of terminal and related facilities and 43,000 square yards of ramp/apron area. Through a letter of agreement with the Federal Aviation Administration's (FAA) Jacksonville Air Route Traffic Control Center, Myrtle Beach AFB maintains air traffic control responsibility below 10,000 feet MSL for all aircraft departing or arriving at the base or jetport.

A majority of the operations conducted at the airport are military (approximately 70%), with civil aircraft activity limited to scheduled air carrier jet and commuter turboprop operations (approximately 30%). Table 3.1.1-2 presents the operations by major aircraft categories/types for the airfield in 1989. The data are based on approximately 29,756 total aircraft sorties, where one sortie equals one aircraft arrival and departure.

The A-10 Thunderbolt II is the most operated aircraft at the airfield, followed by commuter turboprops, air carrier jets, transient military aircraft and helicopters, and military Aero Club aircraft (light single-engine airplanes). As the predominant user of airspace around Myrtle Beach AFB, A-10s will usually depart under visual flight rules (VFR) to the northeast, west, or southwest and reach 1,600 feet MSL altitude. Under instrument flight rules (IFR), the A-10s depart on stereotyped flight plan routes to the north, west, or southwest and reach 3,000 MSL before proceeding to flight level (FL) 200 (20,000 feet MSL altitude) enroute to various low-altitude training areas. Commercial air carriers usually depart the Jetport to the west toward Florence, South Carolina, or northeast toward Wilmington, North Carolina. The air carriers lowest filed altitude is FL 200. Standard air carrier departures involve relatively high climbing rates until an altitude of 10,000 feet MSL is reached approximately 20 miles from the airport.

**Table 3.1.1-1**

**Traffic Volume on Roadways Serving Myrtle Beach AFB**

<b>Road Segment</b>	<b>1989 Annual Average Daily Traffic (AADT)</b>	<b>Number of Lanes (one-way)</b>	<b>Maximum Capacity<sup>1</sup></b>
U.S. 17 Business SC 73 to SC 544	28,895	2	96,000
U.S. 17 SC 707 to U.S. 501	37,837	2	96,000
SC 707 SC 544 to U.S. 17	14,821	1	48,000
U.S. 501 U.S. 17 to Pine Island	49,369	2	96,000
SC 544 U.S. 17 to U.S. 17 Business	14,103	1	48,000
Jetport Road U.S. 17 to Jetport	4,590	1	48,000

Note: <sup>1</sup>Maximum theoretical 24-hour capacity based on 2,000 vehicles per hour, per lane.

Source: South Carolina Department of Highways and Public Transportation 1990.

In addition to providing air traffic control for the base and the Myrtle Beach Jetport, Myrtle Beach AFB is responsible for controlling a large area of airspace under 10,000 feet MSL in northeastern South Carolina and southeastern North Carolina (Figure 3.1.1-6). The Jacksonville Air Route Traffic Control Center receives transfers of all aircraft above 10,000 feet MSL.

Conflict between Myrtle Beach AFB air operations and civilian air traffic is minimal. Conflict between Myrtle Beach AFB and Jetport air traffic is prevented through a Joint Use Agreement (JUA) that limits commercial flights to a daily number that does not interfere with military operations. The existing JUA (1990) limits commercial flights to 46 per day. Actual present operations are 25 to 27 per day. Traffic enroute to Grand Strand Airport in North Myrtle Beach (Figure 3.1.1-6) passes over Myrtle Beach AFB at various altitudes ranging from 3,000 to 10,000 feet MSL. In addition, a flight restriction is imposed around Conway Airport (Figure 3.1.1-6) that requires no flying below 3,000 feet MSL within 3 miles of the airport to avoid congestion due to considerable pilot training activity. This buffer requires minor modifications on the approach to the Myrtle Beach AFB/Jetport runway. Myrtle Beach AFB is responsible for scheduling the use of four Military Operating Areas (MOAs), which are used for air-to-air combat training. These MOAs are shown on Figure 3.1.1-6 and are listed in Table 3.1.1-3.

Table 3.1.1-2

**Air Traffic History, Myrtle Beach AFB  
1989 Calendar Year**

Aircraft Type		Number of Sorties
<u>Military Operations</u>		
354th TFW A-10s		18,853
Transient		1,320
Myrtle Beach AFB Aero Club Misc.		<u>919</u>
		21,092
<u>Commercial Operations:</u>		
Piedmont/U.S. Air	737-200	1,250
	737-300	1,261
	737-400	674
	BAC-111	39
	F-28	10
	C-9	322
American Airlines	ATR-42	9
	727-100	617
	Misc.	69
American Eagle	Misc.	356
Eastern Metro		1,232
Atlantic S.E.	Misc.	1,497
Bank Air	Misc.	772
Mountain Air	Misc.	244
Pelican Air	Misc.	305
Tempus Air (Charter)	Concair 580	<u>7</u>
		8,664
<b>TOTAL:</b>		29,756

Source: U.S. Department of the Air Force, Aircraft Traffic History, 1989.

The three A-10 squadrons at Myrtle Beach AFB use several special use airspace areas that are not scheduled by Myrtle Beach AFB. The restricted areas (Designated R) are airspace above air-to-surface ranges and are used for weapons delivery, close air support, and surface attack tactics training. These restricted airspaces, which lie outside the coverage of Figure 3.1.1-6, are listed in Table 3.1.1-4.

#### 3.1.1.4 Utilities

**Water Supply.** Drinking water for Myrtle Beach AFB is pumped from four deep wells on the base. (The 73rd Tactical Control Squadron [TCS] receives its water supply from the City of Myrtle Beach.)

**Table 3.1.1-3**

**Military Operating Areas  
Scheduled by Myrtle Beach AFB**

<b>Designation</b>	<b>Area</b>	<b>Altitude Block</b>
Gamecock A	585 sq mi	7,000 ft MSL to 20,000 ft MSL
Gamecock B	253 sq mi	10,000 ft MSL to 18,000 ft MSL
Gamecock C	676 sq mi	100 ft AGL to 10,000 ft MSL
Gamecock D	800 sq mi	10,000 ft MSL to 23,000 ft MSL

**Table 3.1.1-4**

**Restricted Airspaces Used by  
Aircraft from Myrtle Beach AFB**

<b>Designation</b>	<b>Using Agency (Scheduler)</b>	<b>Approximate Distance From Myrtle Beach AFB</b>
R-3002	Fort Benning, GA	110 miles (southwest)
R-3005	Fort Stewart, GA	90 miles (southwest)
R-3007E (Townsend)	Savannah ANG, GA	110 miles (southwest)
R-5306A (BT9/11)	Marine Corps Air Station- Cherry Point	100 miles (northeast)
R-5306D (Golf 10)	Marine Corps Air Station- Cherry Point	100 miles (northeast)
R-5311	Fort Bragg, NC	90 miles (north)
R-5314 (Dare County)	Seymour Johnson AFB, NC	150 miles (northeast)
R-6002 (Pointsett)	Shaw AFB, SC	45 miles (west)

The base water is chlorinated to meet Environmental Protection Agency (EPA) drinking water standards. For fiscal year (FY) 1989, approximately 210 million gallons were pumped from the four base wells for onbase use. The 73rd TCS used 159,000 gallons of Myrtle Beach-supplied water in FY 1989. A more detailed discussion of the groundwater use in the Myrtle Beach area is presented in Section 3.1.3.2.

Since the summer of 1988, the City of Myrtle Beach has treated surface water from the Intracoastal Waterway for their primary source of public drinking water. Previously, Myrtle Beach acquired its drinking water from approximately 20 deep wells throughout the city. These wells are maintained as a backup source of supply. In 1989, the City of Myrtle Beach supplied 3.3 billion gallons of water to its service area.

The Grand Strand Water and Sewer Authority (GSWSA), which supplies water to the county areas surrounding much of Myrtle Beach AFB, pumps groundwater from a series of wells tapping the Waccamaw/Duplin, Pee Dee, Black Creek, and Tuscaloosa formations. Between June 1989 and June 1990, the GSWSA pumped and provided 1.7 billion gallons of water to its South Strand service area, which surrounds the base.

**Wastewater Treatment.** Wastewater generated at Myrtle Beach AFB is collected by the base-maintained sewer system and transported offsite via Grand Strand Water and Sewer Authority-owned and maintained sewerlines to the Schwartz Wastewater Treatment Plant. Approximately 0.7 million gallons per day (MGD) (annual average) of wastewater is generated by the base and treated at the plant. This represents approximately 16 percent of the annual average flow of wastewater treated at the Schwartz plant. Approximately 34,000 gallons per month generated by the 73rd TCS and the base golf course are treated by the City of Myrtle Beach Wastewater Treatment Plant.

The Schwartz Treatment Plant has existing capacity to treat 8.6 MGD of wastewater to the secondary treatment level, and is currently being upgraded to handle 11.6 MGD. Treated effluent is discharged to the Intracoastal Waterway. The plant treats an annual average flow of 4.38 MGD, with summer the peak high flow period and winter the low flow period. January is the lowest flow month treating 3.0 MGD; July is the peak highest flow month treating 6.2 MGD.

The City of Myrtle Beach provides wastewater treatment for military personnel and base civilian employees who reside in the city's service area. The Myrtle Beach Wastewater Treatment Plant has existing capacity to treat 17.0 MGD of wastewater to the secondary treatment level. Wastewater flow to the plant fluctuates between a low of 1 MGD to a peak of 15 MGD; annual average daily flow at the plant is 8.9 MGD.

**Solid Waste.** Since 1974, all municipal solid waste generated on the base has been removed from the base by a private contractor and disposed of at the Horry County Landfill near Conway. Approximately 98,000 cubic yards of nonhazardous wastes were generated by the base last year.

**Energy.** The Santee Cooper Power Company provides power to Myrtle Beach AFB through a substation located on the west side of the base. The substation transmits an average 4,206,055 kilowatt-hours per month (kWh/mo). The base owns all the facilities and handles distribution of power throughout the base, except for navigational aids equipment. A direct supply is provided by Santee Cooper to all navigational aids facilities (five each) and a small number of other facilities. Approximately 73,311 kWh/mo are used for the navigational aids facilities and other direct supply base facilities, excluding residences. Normal peak electrical power demand by Myrtle Beach AFB is approximately 10 megawatts, which is similar to the power used by a middle-sized industry.

The South Carolina Electric and Gas Company supplies natural gas to the Myrtle Beach area. Natural gas facilities were installed at Myrtle Beach AFB in FY 1989 and delivery started in FY 1990. During October 1989 through January 1990, the base used an average of 2,826,000 cubic feet per month of natural gas.

### **3.1.2 Hazardous Materials/Waste Management**

#### **3.1.2.1 Hazardous Materials Management**

Hazardous materials are used and temporarily stored at the various industrial operations throughout Myrtle Beach AFB. These industrial shops maintain, fabricate, and repair components and parts of aircraft and ground equipment. Hazardous materials used and stored at these facilities include fuels, oils, paint removers, aircraft cleaning compounds, paints, carbon remover, petroleum solvents, insecticides, herbicides, and fungicides. Table 3.1.2-1 lists the major industrial operations at Myrtle Beach AFB that use hazardous materials.

Management of hazardous materials storage, use, and spill prevention and control at Myrtle Beach AFB is outlined in various plans including the Underground Storage Tank Management Plan (May 1988) and the Spill Prevention and Response Plan (SPRP) (April 1987).

*Aboveground and Underground Storage Tanks.* Myrtle Beach AFB has 156 steel storage tanks (aboveground and underground) that are used or have been used for storing jet fuel, fuel oil, diesel fuel, gasoline, used oil, and liquefied petroleum gas (LPG). Tank sizes range from 150 to 1,050,000 gallons. The SPRP lists the size, location, substance stored, and building served for each of these tanks.

Jet fuel (JP-4) is stored in aboveground tanks located in the petroleum, oil, and lubricants (POL) bulk fuel storage area (POL Tank 1: 1,050,000 gallons and POL Tank 2: 420,000 gallons) and in one 1,050,000-gallon storage tank owned by the Myrtle Beach Pipeline Company and located at the onbase Myrtle Beach Pipeline Storage facility. Two aboveground 1,000-gallon tanks at Building 21103 and one underground 2,000-gallon tank at Building 322 also store JP-4. The bulk storage tanks at both the POL facility and the Myrtle Beach Pipeline Storage facility are surrounded by earthen dikes that contain the volume of the storage tank with 1 foot freeboard.

Heating fuels (No. 1, No. 2, and No. 5 fuel oils) are stored in 90 steel tanks ranging in size from 100 gallons to 20,000 gallons. Each fuel oil tank is adjacent to the building it is intended to serve; 18 of the tanks are underground.

Fifty-four tanks ranging in capacity from 150 to 25,000 gallons store other petroleum products such as automobile gas (MOGAS), diesel fuel, and LPG. Nine of the 16 MOGAS storage tanks, 8 of the 21 diesel tanks, and 1 of the 17 LPG tanks are underground. An additional five aboveground permitted waste fuel tanks (two 10,000 gallon, one 5,000 gallon, and two 1,000 gallon) at Building 89008 are used to store waste oil and contaminated fuels.

Myrtle Beach AFB has 24 underground storage tanks (USTs) subject to federal and state regulations. The regulated tanks contain a variety of petroleum products such as diesel, JP-4, gasoline, MOGAS, and oil, and range in size from 150 gallons to 25,000 gallons. Table 3.1.2-2 lists the responsible organization, location, size, and contents of the regulated tanks onbase. Myrtle Beach AFB has an Underground Storage Tank Management Plan (April 1990) that outlines the activities necessary to maintain and manage the base USTs in an environmentally safe and responsible manner. The plan was prepared in accordance with the South Carolina Underground Storage Tank Control Regulations (SCUSTCR) R.61-62 and the Resource Conservation and Recovery Act (RCRA), as amended in 1984 (Title 40 CFR Parts 280.10 through 280.74).

Physical testing of tanks pursuant to state and federal regulations is performed when inventory review methods, environmental and/or mechanical signs, or hazard ranking indicate potential leaks. Testing and monitoring methods are variable and a thorough evaluation is required to determine the most

**Table 3.1.2-1****Industrial Operations Utilizing Hazardous Materials, Myrtle Beach AFB**

<b>Shop Name</b>	<b>Location (Bldg. No.)</b>
<b><u>354th Component Repair Squadron (CRS)</u></b>	
Machine Shop	352
Metals Processing	352
Electric Shop	352
Structural Repair	352
Non-Destructive Inspect (NDI)	352
Wheel & Tire Shop	352
Engine Shop	324
Pneudraulics Shop	324
Aero Repair Shop	352
<b><u>354th Equipment Maintenance Squadron (EMS)</u></b>	
Aerospace Ground Equipment (AGE) Repair	320
Non-power AGE Shop	324
Fuels System Repair	328
Corrosion Control	355
Armament Shop	505
Missile Maintenance	581
Munitions Equipment Maintenance	580
Conventional Munitions Maintenance	587
<b><u>354th Transportation Squadron (TS)</u></b>	
Paint Shop	514
Refueling Maintenance	516
Welding Shop	514
Battery Shop	514
General Maintenance	514
<b><u>354th Civil Engineering Squadron (CES)</u></b>	
Entomology Shop	220/562
Heating Shop	220
Liq. Fuels/Maintenance Shop	220
Paint Shop	217
Plumbing Shop	220
Power Production	220
Refrigeration Shop	220
Structural Maintenance	221
Welding Shop	221

**Table 3.1.2-1, Continued**

<b>Shop Name</b>	<b>Location (Bldg. No.)</b>
<b><u>Base Hospital</u></b>	
Hospital Lab	114
Hospital Operating Room	114
Medical X-ray Lab	114
Dental Lab	334
<b><u>Other Areas</u></b>	
Photo Lab	502
Fuels Lab	518
Small Arms Range	544
Auto Hobby Shop	255
Radar Maintenance	364
Precision Measurement Equipment Lab (PMEL)	519
Electronic Countermeasure (ECM) Shop	325
AGE Vehicle Maintenance	454
Base Service Station	200

Source: Spill Prevention and Response Plan, Myrtle Beach AFB, 1987.

cost-effective method, applicable to each site, which satisfies SCUSTCR requirements. Available leak detection methods include volumetric, nonvolumetric, in-tank monitoring, and leak effects. If leaks are indicated or suspected, the Base Environmental Coordinator (DEEV) conducts the preliminary Site Assessment for each tank, ensures pretesting/monitoring considerations are addressed, and provides recommendations on testing and monitoring methods. The Chief, Liquid Fuels Section (DEMM) supervises UST testing done by subordinate elements.

**Pesticides/Herbicides.** A variety of chemicals are also used at Myrtle AFB to control pest infestations and ground foliage. A list of the pesticides and herbicides stored on the base is included as part of Annex I of the Myrtle Beach AFB SPRP (April 1987) under the Chemical, Drum, and Small Container Storage Area category. Approximately 500 gallons and 3,000 pounds of assorted insecticides and herbicides in containers ranging in size from 5-gallon cans to 55-gallon drums are stored at the Entomology Storage Area, Building 552.

**Other Hazardous Materials.** Corrosives, acids, compressed gases, and various other hazardous materials are received and temporarily stored at the Supply Storage Area (Building 211/213). Chemicals stored in supply open storage are distributed to the various industrial shops and other base operations such as the hospital, armament shop, and labs, to replenish depleted stocks.

### **3.1.2.2 Hazardous Waste Management**

Myrtle Beach AFB operates both as a generator of hazardous waste and a Treatment, Storage, and Disposal (TSD) facility. Approximately 75,700 gallons of hazardous waste are generated by the base per year by activities such as spray painting, solvent degreasing, paint removal, laboratory analysis, open burning/open detonation of unservicable munitions items, corrosion control residues, and other

**Table 3.1.2-2**

**Regulated Underground Storage Tanks at Myrtle Beach AFB**

<b>Location (Bldg.)</b>	<b>Size (Gal)</b>	<b>Contents</b>
89001	265	Gasoline
89014	265	Gasoline
89016	265	Gasoline
89017	265	Gasoline
89018	265	Gasoline
517	150	Gasoline
560	500	Diesel
1280	150	Diesel
220	550	MOGAS
513	5,000	Diesel
513	5,000	Gasoline
513	5,000	Unleaded Gasoline
513	5,000*	Unleaded Gasoline
522	25,000	Diesel
522	25,000	Gasoline
200	10,000	Gasoline
200	10,000	Gasoline
200	10,000	Gasoline
200	10,000	Gasoline
200	500	Waste Oil
368	500	Hydraulic Waste
368	500	Hydraulic Waste
322	2,008	JP-4
322	1,004	MOGAS

Note: \*Tank is empty and programmed for replacement.

Source: Underground Storage Tank Management Plan, Myrtle Beach AFB, May 1988.

chemical products that have exceeded their shelf lives. A Hazardous Waste Management Plan (April 1990) has been developed and implemented to ensure compliance with RCRA requirements for the installation. Hazardous wastes generated at various locations are stored at accumulation points in or adjacent to work places prior to being turned over to the Defense Reutilization and Marketing Office (DRMO). Storage in the accumulation point is temporary and cannot exceed 90 days from the time the waste begins to accumulate. Myrtle Beach AFB accumulation points are listed in Table 3.1.2-3. Satellite accumulation points are also operated within work places to collect up to 55 gallons of hazardous waste prior to transfer to accumulation points or the DRMO.

Two locations store hazardous waste for more than 90 days and are TSD facilities regulated under 40 CFR 265: (1) Waste Fuels Storage Area, Facility #89008 and (2) DRMO Storage Area, Building 526. Although listed as a storage facility, the Supply Open Storage Area, Building 208, is not a RCRA

**Table 3.1.2-3****Hazardous Waste Accumulation Points  
on Myrtle Beach AFB**

<b>Facility</b>	<b>Building</b>
AGE Servicing Building	320/321
AGE Flightline Area	no building number
A-10 Engine Shop	324
Propulsion Support	324
*EMS/NDI Lab	352
*Wheel and Tire Shop	352
EMS Corrosion Shop	355
39th AARS Detachment 11	359
Base Service Station	200
Auto Hobby Shop	255
CE Power Production	220
*CE Pavements & Groups	220
Transportation Maintenance	514
Refueling Vehicles Maintenance	516
*CE Paint Shop	224
73rd TCS AGE Vehicle Maintenance	457
Fuels Management	515
*Photo Lab	502
*Armament Shop	505
*TMDE	519
*Fire Department Maintenance	360
*Golf Course Maintenance	455

Note: \*Satellite Accumulation Point: Up to 55 gallons of hazardous waste generated can be stored. Containers with excess must be removed from the area within 3 days to an accumulation point or permitted storage area.

Source: Hazardous Waste Management Plan, Myrtle Beach AFB, April 1990.

storage facility because polychlorinated biphenyls (PCBs) are covered separately under TSCA. The DRMO administers annual contracts for hazardous waste disposal services and maintains all records and shipping manifests related to disposal activities. The DRMO is responsible for all hazardous materials except for the categories listed below, cited in the Defense Environmental Quality Program Policy Memorandum (DEQPPM) 80-5, and other categories afforded special handling, i.e., waste petroleum products, PCB transformers, and waste oil generated at the base service station and auto hobby shop.

- "Toxicological, biological, radiological, and lethal chemical warfare materials which, by U.S. law, must be destroyed."
- "Municipal type garbage, trash, and refuse resulting from residential, commercial, agricultural, and community activities, which the facilities engineer or public works officer routinely collects."

- "Contractor generated materials which are the contractor's responsibility for disposal under the terms of the contract."
- "Refuse and other discarded materials which result from mining, dredging, construction, and demolition operations."
- "Unique wastes and residues of a nonrecurring nature which research and development programs generate."

Waste petroleum products are given to the Fuels Management Branch, Building 515, and are stored in the Waste Petroleum Storage Area, Facility No. 89008, across from Building 515. Inventories of the Waste Petroleum Storage Area tanks are monitored by Fuels Management personnel and disposed of through DRMO or contracting.

Waste oils generated by the Base Service Station and the Auto Hobby Shop are stored in tanks located in Building 200 and Building 255. Disposal of waste oil is accomplished under a contract between these facilities and DHEC-licensed waste oil disposers.

### **3.1.2.3 Installation Restoration Program Sites**

The Installation Restoration Program (IRP) predates the Environmental Protection Agency's (EPA) Superfund. Current authority for DOD to manage Air Force cleanup under the IRP was contained in the 1980 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Public Law 96-510, commonly known as Superfund, was passed later in 1980. The Superfund empowered the EPA to cleanup waste disposal sites that pose a threat to human health or the environment. The same law authorized the President to delegate to the Secretary of Defense the response authority for releases of hazardous substances from DOD facilities. Executive Order 12316 further mandates DOD to cleanup Air Force waste disposal sites.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) provided authority for the Secretary of Defense to carry out the Defense Environmental Restoration Program (DERP) in consultation with the EPA. Executive Order 12580 was signed in January 1987. This law led to the alignment of IRP terminology and program structure more closely to the EPA Superfund Program and the National Contingency Plan (NCP).

The IRP was implemented to identify, report, and correct potential environmental deficiencies that could result in surface water, soil, and/or groundwater contamination, and the migration of contaminants beyond DOD installation boundaries. The IRP was originally developed as a four-phase program as follows:

- Phase I Problem Identification/Records Search
- Phase II Problem Confirmation and Quantification
- Phase III Technology Base Development
- Phase IV Corrective Action

As a result of the SARA of 1986, the terminology and procedures were changed. There are now three phases as follows:

- Preliminary Assessment/Site Inspection (PA/SI)
- Remedial Investigation/Feasibility Study (RI/FS)
- Remedial Design/Remedial Action (RD/RA)

The objectives of Phase I, Problem Identification/Records Search, were to identify and, based on oral and written information, assess past disposal sites. The potential hazard to human health or the

environment as a result of direct contact, contaminant migration, or contaminant persistence was assessed using a rating system that considered factors such as site characteristics, waste characteristics, potential for contamination, and waste management practices. Phase I was conducted at Myrtle Beach AFB from June 29 through July 2, 1981. Table 3.1.2-4 lists, in recommended remediation priority, the 15 sites that were identified as potential sources of contamination and recommended for follow-on Phase II Confirmation and Quantification studies.

The objectives of Phase II, Problem Confirmation and Quantification, were to investigate the most likely pathways for contamination from a site and to confirm the presence or absence of contamination along those pathways. Upon confirmation of contamination, the magnitude and extent were further investigated. The results were then quantitatively evaluated.

Phase II, Confirmation Studies, was initiated in October 1982 and completed in October 1983 at Myrtle Beach AFB. A new site, the Pipeline Spill Area, was added to the original 15 Phase I sites and evaluated during Phase II confirmation studies for a total of 16 sites. Eleven potential contaminant source areas were identified in the Phase II studies, but because some of the sites were contiguous, they were grouped together to form eight source areas:

- Fire Training Areas (FTA) #1 and #2;
- Landfill (LF) #3/Weathering Pit (WP) #2;
- FTA #3;
- WP #1;
- POL Fuel Spill Area;
- Landfills #1 and #4;
- Flightline Area (FLA); and
- Pipeline Spill Area.

A Long Term Monitoring Stage I Remedial Investigation was initiated in 1987 to confirm and further assess the IRP sites evaluated in the 1982-1983 Phase II Confirmation Studies. The objectives of the Long Term Monitoring Stage I Program were to recommend remedial activities for seriously contaminated sites, and to develop and install a long-term monitoring program for less seriously contaminated sites. The field program was conducted from November 1987 through December 1989 and included soil gas surveys, a well inventory and integrity survey, a groundwater/tidal effects study, surface and subsurface soil and water sampling and analysis, measurement of water levels, and a borehole and monitor well installation. The Pipeline Spill Area was not evaluated and is currently undergoing remediation by the Myrtle Beach Pipeline Company. Seven of the Phase II sites, plus the MOGAS Storage Tank Area and the active Fire Training Area #4, were investigated in this study. Table 3.1.2-5 identifies the investigative activities conducted at each of the nine sites. Since this study, the BX Service Station and Engine Shop release sites have been added to the IRP. The locations of the current IRP sites are shown in Figure 3.1.2-1.

**Fire Training Areas #1 and #2.** These were open areas where waste fuel, oils, and solvents were poured onto the ground, ignited, and then extinguished as part of firefighting training exercises. Areas #1 and #2 were operated from 1955 to 1964. The Phase II Confirmation Study groundwater samples indicated low concentrations of benzene, chloroform, toluene, and ethylbenzene.

**Landfill #3.** This landfill was operated as a trench and cover operation with no burning during 1964 to 1968. The landfill was closed in 1968. In 1976, trenches were constructed perpendicular to the existing ditches for the disposal of grease and scum from the base anaerobic digesters. The trenches were approximately 3 feet deep with 18 inches of material from the digesters placed in them. The trenches were then closed and the site regraded.

Table 3.1.2-4

**Summary Ranking of Potential  
Contamination Sources**

<b>Rank</b>	<b>Site Name</b>	<b>Period of Operation</b>
1	Weathering Pit #2	1979-1981
2	Myrtle Beach Pipeline Corp.	1981 <sup>1</sup>
3	POL Bulk Fuel Storage Area	1963-1967 <sup>1</sup>
4	Flightline Contaminated Area	1977 <sup>1</sup>
5	Landfill #3	
6	Fire Training Areas #1 & #2	1955-1964
7	Weathering Pit #1	1973-1978
8	Fire Training Area #3	1965-1969
9	Landfill #4	1968-1972
10	Underground Waste Chemical Storage	1978-present
11	Landfill #1	1955-1960
12	Landfill #2	1960-1964
13	Landfill #5	1973-1974
14	Radioactive Vault	1959
15	Fire Training Area #4	1970-1981

Note: <sup>1</sup>Spill or date of observation.

Source: Engineering Science 1981.

**Weathering Pit #2.** This site, located along the southeast border of Landfill #3, was constructed to expose spent fuel filters and other sorbent materials soaked in petroleum products to the open air and sunlight. Weathering Pit #2 was used during the period from 1979 to 1982 and received unknown quantities of waste oils, solvents, and paint strippers. In 1982, 542 tons of contaminated soil were removed from Weathering Pit #2 and taken to an approved landfill prior to groundwater monitoring activities. Sampling conducted during the initial Phase II study suggested that the shallow water table in areas hydraulically downgradient of these contaminant sources had received varying degrees of groundwater quality degradation. Contaminants detected included benzene, toluene, ethylbenzene, chloroform, chloroethylene, methylene chloride, 1,2-dichloroethane, trans-1,2-dichloroethane, chlorobenzene, and 1,1-dichloroethane.

**Fire Training Areas #3.** Fire Training Area #3 was in operation from 1965 to 1969. Fire training exercises conducted at this site were similar to those performed at Fire Training Areas #1 and #2. Results of the initial Phase II study indicated that the shallow monitoring wells contained higher levels of phenol and volatile organic compounds as compared to the other sites. Volatile organic compounds detected at this site included toluene, chlorobenzene, ethylbenzene, benzene, and 1,1-dichloroethane.

**Table 3.1.2-5**  
**Investigative Activities for Each IRP Site**  
**Myrtle Beach AFB**

Investigative Activities	FTA #1 and #2	LF #3/WP #2	FTA #3	WP #1	POL	LF #1 and #4	FLA	MOGAS	FTA #4
# of Existing Wells (1)	7	11	5	10	5	6	2	0	0
# of New Wells	1	1	3	3	0	1	1	3	1
Total # of Wells	8	12	8	13	5	7	3	3	1
Total Footage of New Wells (0)	17.5	16.5	75.5	76	0	16	17	48.5	16
# of Existing Borings	5	3	2	5	1	5	0	0	0
# of New Borings	1	0	0	0	0	0	0	2	0
Total # of Borings	6	3	2	5	1	5	0	2	0
Footage of Old Borings (0)	50	30	22	53	7	50	0	0	0
Footage of New Borings (0)	12	0	0	0	0	0	0	17	0
Total Footage of Borings (0)	62	30	22	53	7	50	0	17	0
# of Surface Water (SW) Locations	0	2	1	0	1*	1	1	2**	0
# of NPDES/ECAMP Locations	0	1	0	0	0	0	0	0	0
Total # of SW Locations	0	3	1	0	1	1	1	2	0
# of Soil Surveys	0	0	0	0	0	0	0	1	1
# of Probes	0	0	0	0	0	0	0	26	26
Tidal Effects Survey									
# of Wells Sampled	2	4	0	0	0	0	1	0	0
# of Surface Water Locations		1					1		

(1) Does not include damaged or lost wells

\* Includes SW-7

\*\* Includes SW-5 and SW-6

Source: ERM 1990.

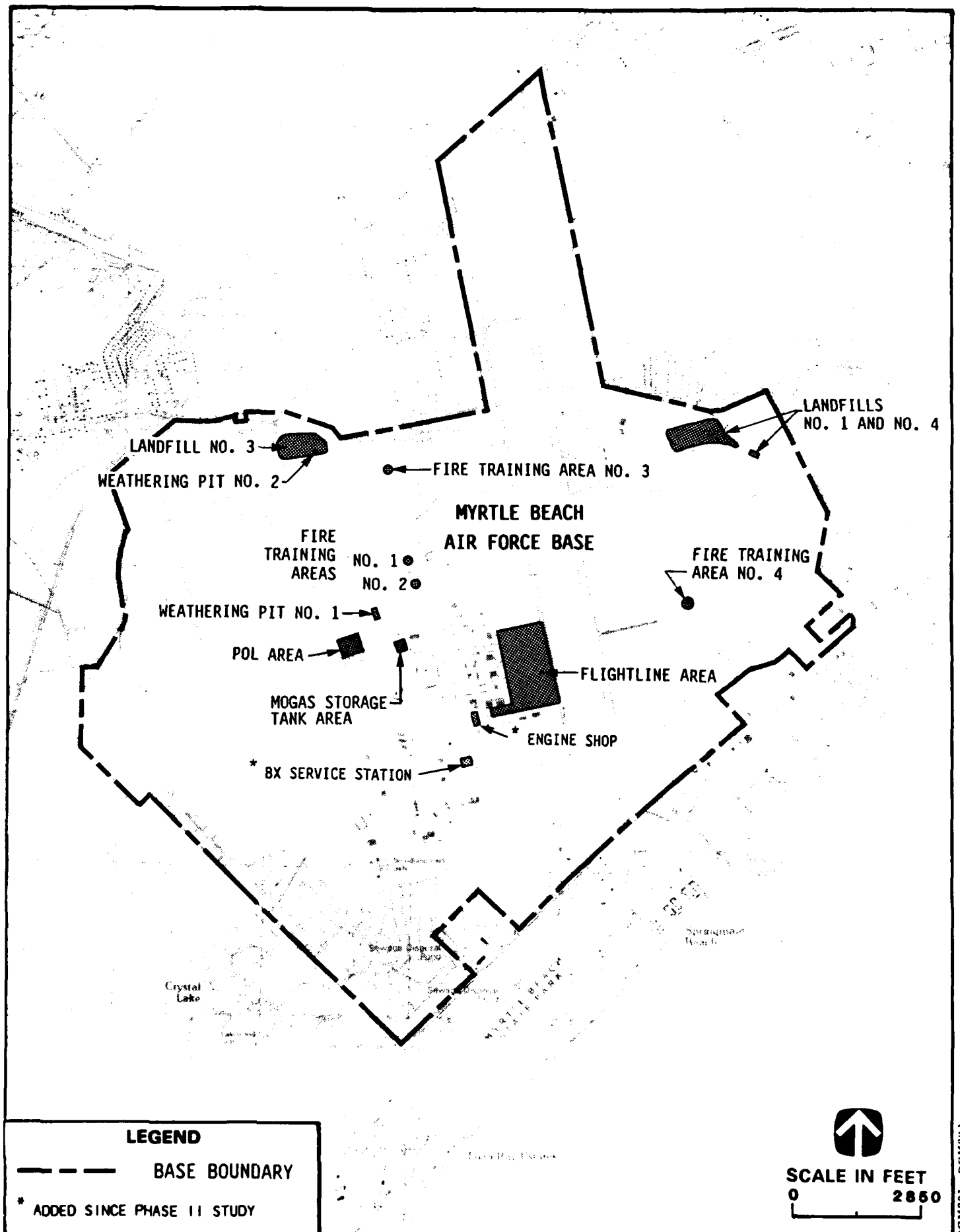


FIGURE 3.1.2-1 INSTALLATION RESTORATION PROGRAM (IRP) SITES, MYRTLE BEACH AFB, SOUTH CAROLINA

**Weathering Pit #1.** This site, located near the POL Fuel Spill Area, was used for the same purpose as Weathering Pit #2 during 1973 to 1978. Phase II study sampling detected low to moderate levels of organic compounds in the shallow water table. Contaminants included benzene, ethylbenzene, toluene, and trans-1,2-dichloroethane.

**POL Area.** The POL fuel spill occurred between Tank 41103 and a 50,000-gallon tank that was adjacent to it. Approximately 10,000 gallons of JP-4 leaked in the area between 1963 and 1967. Only low concentrations of benzene, ethylbenzene, chlorobenzene, and toluene were detected in the shallow groundwater.

**Landfill #1.** This was a trench, burn, and cover operation in the northeastern portion of the base, encompassing approximately 9 acres. Trenches were normally constructed approximately 16 feet in width and averaged 5 to 10 feet deep. Landfill #1 operated from 1955 to 1960 after which the landfill was closed and the base golf course was constructed over it.

**Landfill #4.** This landfill was constructed on top of an area that served as a sand borrow pit and operated as a trench and fill landfill with no burning of trash. Low levels of contaminants were detected in the shallow and deep monitoring wells sampled during the Phase II study. Contaminants included benzene, toluene, trans-1,2-dichloroethane, and chlorobenzene at this site.

**Flightline Area.** Contamination in the Flightline Area, adjacent to Building 358, was encountered during a pump test conducted in 1977 by the South Carolina Water Resources Commission. The chemical nature and quantity of the contaminants was not documented but the suspected source was the POL area. During the 1983 Phase II study, analysis of groundwater samples in this area detected only low levels of chloroform and 1,2-dichloroethane from a shallow monitoring well.

**MOGAS Storage Tank.** The Military Service Station MOGAS Storage Tank was drained and abandoned in 1983 after discovery of a leak and related soil contamination. Besides the tank that failed in 1983, the Military Service Station (MOGAS) has removed two additional tanks from service. The Stage I Remedial Investigation (RI) was to investigate and determine the magnitude and extent of the contamination.

**Fire Training Area #4.** This is an active training site used for staging firefighting training exercises on the base. Sampling has not been conducted at this site and, as previously mentioned, the Stage I RI was to investigate and determine the magnitude and extent of any contamination.

**BX Service Station.** This site's four 10,000-gallon steel gasoline storage tanks were confirmed to be leaking in March 1988, and were subsequently taken out of service and replaced with double-walled fiberglass tanks and associated piping. Visibly contaminated soil adjacent to the tanks was also removed. Further site investigations conducted in July 1989 included a soil-gas survey, soil sampling, and groundwater monitoring program. Results of the investigation indicated low levels of benzene, toluene, ethylbenzene, and xylene contamination in soil and groundwater in an area immediately adjacent to the former tank locations. A monitoring program has been established to determine whether further future action is warranted.

**Engine Shop Release Site.** The Engine Shop Release Site (B-324) was discovered in April 1987. Solvents used in the vat tanks for cleaning engine parts were pumped out of the tanks periodically and solvents properly disposed. The tanks were then rinsed of the remaining sediment and drained to an oil/water separator. Investigation later revealed these drains terminated into a sand pit and not the adjacent oil/water separator. Remedial investigation (report of 24 May 1990) indicates low to moderate contamination in the shallow and deep monitoring wells consisting primarily of chlorinated solvents.

The IRP Long Term Monitoring Stage I Draft Technical Report (February 1990) findings and recommendations are summarized in Table 3.1.2-6.

#### **3.1.2.4 Asbestos**

Myrtle Beach AFB has completed an Asbestos Inventory Survey of approximately 90 percent of the base buildings (excluding housing units); approximately 75 percent of those buildings surveyed have been sampled. Results indicate that an estimated 150 facilities with asbestos-containing materials have the potential to release airborne asbestos fibers if damaged or removed. A Base Asbestos Management Plan is currently being prepared to establish policies and procedures for asbestos contamination abatement. According to Air Force policy, decisions to remove damaged friable asbestos materials are based on the degree of risk to facility occupants, use of the facility, and cost-effectiveness. Asbestos-containing materials are also to be removed or encapsulated when the opportunity exists during minor construction or repairs. Asbestos-containing materials that are not damaged or subject to potential disturbance and therefore not posing a potential health threat will be left in place.

#### **3.1.2.5 Polychlorinated Biphenyls**

Myrtle Beach AFB has tested all base transformers for PCBs. A hazardous waste management survey conducted in April 1987 indicated 9 PCB (above 500 parts per million [ppm]) and 39 PCB-contaminated (50 to 499 ppm) transformers were in use at the base. These transformers have been scheduled for replacement, or for flushing of the contaminated fluid until the PCB concentration level is below 50 ppm, by the end of FY 1991. Out-of-service transformers and equipment contaminated with at least 50 ppm PCBs are stored in the PCB Storage Facility, Building 208. The DRMO is responsible for initiating the procedures to effect disposal of PCB or PCB-contaminated transformers/capacitors, according to the Toxic Substances Control Act (TSCA).

#### **3.1.2.6 Radon**

The Radon Assessment and Mitigation Program (RAMP) Initial Screen Survey, conducted in 1988 for Myrtle Beach AFB, indicated a low probability for the existence of elevated indoor radon levels. The low probability category was assigned to installations where none of the structures sampled were statistically found to have radon concentrations greater than 4 picoCuries per liter (pCi/l). A follow-on RAMP Detailed Assessment Survey is not required.

#### **3.1.2.7 Radioactive Waste**

No radioactive wastes are permanently stored on the base; however, in 1959, two radio tubes were reportedly placed in a concrete vault constructed adjacent to the taxiway near Building 11605. The vault is not currently indicated as a radioactive site and the status of the two radio tubes is unknown. A test of the vault in March 1988 did not detect any radiation above background levels.

#### **3.1.2.8 Ordnance**

A variety of types of weapons and ammunition are stored at the base's magazine area (Section 3.1, Figure 3.1.1-2). The total net explosive weight of the ordnance stored in the 12 storage structures of the magazine is 121,300 pounds. With the exception of 30-millimeter ammunition for the A-10, ordnance is infrequently carried on military aircraft flying into and out of the base.

An 18-acre Explosive Ordnance Range is on the west side of the base and is used by the Explosive Ordnance Disposal (EOD) Team and the Security Police for initial and proficiency training. EOD

**Table 3.1.2-6**  
**Summary of IRP Phase I Long-Term Monitoring Findings and Recommendations**  
**Myrtle Beach Air Force Base**

<i>Site</i>	<i>Hydrology</i>	<i>Contaminants</i>	<i>Site Category</i>	<i>Future Recommendations</i>
FTA #1 and #2	1 well installed downgradient. Garden plot irrigations may be recharging surficial aquifer. Groundwater flow direction in the surficial aquifer is to the north, east, and south.	Groundwater: Total lead*	II**	Replace GM-8 and sample wells GM-3,4,5,6,7,8,9 and MW-101 to monitor for total and dissolved lead.
LF #3/WP #2	1 well installed. Groundwater flow patterns not adequately characterized.	Groundwater: benzene* and total chromium* (elevated chromium was detected in an upgradient well).	II	Replace GM-14 and 41. Install new well pair north edge of landfill, install one shallow well to the north and one shallow well to the east of the new well pair, and add surface water location then sample all locations for volatiles and chromium.  Investigate WP #2 to characterize the wastes then fill it in.  Regrade and seed the landfill.  Conduct risk assessment and feasibility study.
FTA #3	3 wells installed. Groundwater flow direction in surficial aquifer changes depending on the seasonal high water table. GM series wells may be acting as conduit between the water table aquifer and the shallow artesian zone.	Groundwater: benzene* chlorobenzene*, styrene*, TCE*, and vinyl chloride*.	II	Install additional wells and add surface water location then sample all the locations for volatiles and semivolatiles.  Conduct pump test to determine hydraulic connection between shallow and deep sands.  Conduct risk assessment and an analysis of remedial alternatives.
WP #1	3 wells installed. Groundwater flow direction in the surficial aquifer is adequately characterized but not in the shallow artesian zone. GM series wells may be acting as a conduit between the surficial aquifer and the shallow artesian zone.	Groundwater: benzene*, toluene, ethylbenzene, 1,2; 1,3; 1,4-dimethylbenzene, chlorobenzene, 1,2; 1,3; 1,4-dichlorobenzene, TCE, 1,2-dichloroethane*, vinyl chloride*, and total lead*.		Investigate active WP, Entomology Building, discarded drums in ditch, and the waste oil tank area as potential new source areas.  Install additional wells and sample for volatiles, semivolatiles, and lead to determine extent of contamination and to monitor lead levels in MW-107.  Conduct pump test to determine hydraulic connection between shallow and deep sands.  Conduct risk assessment and feasibility study when sufficient data are available.

Table 3.1.2-6, Page 2 of 2

Site	Hydrology	Contaminants	Site Category	Future Recommendations
LF #1 and #4	1 well installed. Golf course lakes and irrigation may be affecting groundwater flow patterns and water.	No evidence of contaminants at elevated levels.	I	No further IRP activity required.
POL	No new wells installed. Groundwater flow direction adequately characterized. Extent of contamination not determined.	Groundwater: 1,2; 1,3; 1,4-dimethyl benzene, 1,3; 1,4-dichlorobenzene, benzene, ethylbenzene, and xylene.	II	Install new wells and surface water locations for volatiles and lead.
MOGAS	3 wells installed. Site hydrogeology inadequately characterized.	Groundwater and surface water: benzene*, toluene*, ethylbenzene*, xylene, 1,4-dichlorobenzene*, and total and dissolved lead.	II	Remediate free product in surficial aquifer. Install new wells and sample all locations to better characterize the site hydrogeology and flow patterns. Investigate potential source areas near the background well MW-111. Conduct risk assessment and feasibility study when sufficient data are available.
FLA	1 well installed. Groundwater divide seems to be located at this site.	No elevated levels of contaminants in groundwater or surface water for GM well network. Lead* above MCL in MW-110.	II	Shift focus of IRP work to Bldg. 324 and include GM-37, GM-38, and MW 110 in that network. Continue to monitor lead contamination in wells GM-37, GM-38, and MW 110 and all MW wells installed by Law Engineering for the Solvent Cleaning Area by sampling these wells and the surface water locations for total and dissolved lead.
FTA #4	1 well installed. Hydrogeology inadequately characterized. Groundwater flow direction cannot be determined without additional wells installed.	Groundwater: low levels of TPH and total lead. Soils: TPH near industrial background level of 100 ppm.	II	Install new wells to better characterize the site hydrogeology and groundwater flow patterns, then sample all locations for volatiles, semivolatiles, TPH, and lead to determine the nature and extent of potential contamination. Continue to monitor the site during the course of the active fire training activities.

Notes: \* These compounds exceeded federal or state environmental standards for drinking water.  
 \*\* Site categories: I = Requires no further action; II = requires further IRP effort.

Source: ERM 1990.

teams of ten people use the range three times per month to practice explosion and safing techniques on C-4 plastique, TNT, detonating cord, time fuses, shape charges, improvised explosive device training, and 50-caliber cartridges.

### **3.1.3 Natural Environment**

#### **3.1.3.1 Geology and Soils**

**Geology.** The Myrtle Beach area is underlain by approximately 1,400 feet of unconsolidated and semi-consolidated coastal plain deposits which rest uncomfortably on a metamorphic and crystalline rock basement. These deposits strike in a generally northeast-southeastward direction, dip gently seaward, and thicken in a southeastward direction. In ascending order, geologic units of the Upper Cretaceous period which occur in the Myrtle Beach area include the Middendorf, Black Creek, and Pee Dee formations. These units represent a sequence from three adjacent depositional environments: the basal Middendorf Formation was deposited under fluvial conditions; the Black Creek unit was formed in an estuarine setting; and the Pee Dee Formation was deposited in an open marine shelf. All three of these units become considerably thinner and outcrop in the upper Coastal Plain, west of Myrtle Beach.

The geologic units that overlie the Cretaceous deposits include the Pliocene Duplin and Bear Bluff formations; the Pleistocene Waccamaw, Canepatch, and Socastee formations; and the Holocene undifferentiated unit.

**Soils.** Surface soils on Myrtle Beach AFB are classified primarily as Socastee Backbarrier sediments. These are moderately permeable, fine-grained soils. The eastern edge of the base consists of Myrtle Beach sediments, which are highly permeable, coarse-grained soils. Based on soil survey maps by the Horry County Soil Conservation Service, soils in the project area have been described as occurring in nearly level areas and consisting of very poorly drained to poorly drained soils with a loamy surface layer and a clay-like subsoil.

#### **3.1.3.2 Water Resources**

**Groundwater.** The Myrtle Beach area of Horry County is underlain by four main aquifer systems: the lowermost stratigraphic unit of the Middendorf (or Tuscaloosa) Formation, the Black Creek, the Pee Dee, and the combined shallow water table and artesian systems. These aquifers, except for the Middendorf which contains salty water, are known to contain water that is generally acceptable for domestic supplies, although some treatment may be required to reduce levels of undesirable constituents such as iron and sulfur. Table 3.1.3-1 shows the typical water quality for the Black Creek, the Pee Dee, and the water table aquifer systems.

The Middendorf aquifer system (within the Middendorf Formation) contains salty water (250 milligrams per liter [mg/l] or more of chloride) throughout all of the Grand Strand and possibly all of Horry County and has not been developed as a groundwater supply.

The Black Creek Formation, which lies above the Middendorf Formation, contains the Black Creek aquifer system, which is the most important source of groundwater in Horry County. This system provides municipal, industrial, and domestic water supplies. The Black Creek aquifer system is an artesian (confined) system hydraulically separated from the subadjacent Middendorf system.

Within the Pee Dee Formation, the Pee Dee aquifer system is typically artesian in nature and is probably capable of producing large quantities of groundwater. This aquifer system is occasionally used in conjunction with the subadjacent Black Creek system as a potable water source. Because of

Table 3.1.3-1

**Typical Groundwater Quality for Aquifer Systems  
Beneath Myrtle Beach Area of South Carolina  
(All concentrations in milligrams per liter,  
unless otherwise specified)**

	Myrtle Beach AFB		Eagle Nest Golf Course,		Myrtle Beach AFB,		Myrtle Beach AFB,	
	No. 3	Well Ho-226, Black Creek Aquifer System*	Well Ho-286, Peedee Aquifer System*	Upper Tertiary/ Lower Quaternary**	Well Ho-350, Bldg. 514, Water Table System,	Bldg. 690, Water Table Aquifer System*** (No longer in use)		
<b>Well Data</b>								
Latitude (deg/min/sec)	33 39 38		33 53 25	33 40 54			33 39 25	
Longitude (deg/min/sec)	78 56 53		78 56 38	78 56 18			32	
Depth (feet)	760		132	42			unknown	
Screened Interval (feet)	512-756		unknown	32-42				
<b>Groundwater Quality</b>								
pH (std. units)	8.6		7.8	6.9			7.0	
Specific Conductance (umhos/cm)	1,071		430	324			218	
Dissolved Solids	531		276	224			132	
Hardness (as CaCO <sub>3</sub> )	12		270	140			--	
Alkalinity (as CaCO <sub>3</sub> )	551		221	148			--	
Bicarbonate (HCO <sub>3</sub> )	563		270	180			93	
Fluoride (F)	2.8		0	0.2			0.1	
Chloride (Cl)	79		14	18			20	
Sulfate (SO <sub>4</sub> )	1.3		2.8	0.4			2	
Sodium (Na)	280		8.3	15			12	
Potassium (K)	3.7		0.6	1.5			0.4	
Calcium (Ca)	5.0		100	51			30	
Iron (Fe) (dissolved)	<0.4		6.1	10			2.7	
Manganese (Mn)	--		0	0.1			--	
Silica (SiO <sub>2</sub> )	14		7.3	33			13	

\* From Zack 1980:9-14.

\*\* From Zack 1977:54-55, 90, 92.

\*\*\* From Environmental Protection Agency 1977:2-21.

Source: ERM 1990.

the variable quality of the groundwater within the Pee Dee system (often being inferior to that of the underlying Black Creek system), development tends to be fairly localized.

Groundwater is the principal source of water for Myrtle Beach AFB and domestic, public supply, and industrial use in Horry and Georgetown counties. However, the City of Myrtle Beach uses surface water from the Intracoastal Waterway to supply all of its drinking water needs, and the City of Georgetown uses surface water from the Pee Dee River to supply part of its needs. Records on the quantity of water used in the area are incomplete; however, a water use study completed by the South Carolina Water Resources Commission (SCWRC) in 1975 indicates that the estimated average daily pumpage of groundwater from about 100 municipal and other public supply wells and industrial wells was approximately 10 MGD. The peak water demand (approximately 13 to 16 MGD) occurs in the summer months on the Grand Strand.

The Black Creek aquifer constitutes the most important source of groundwater throughout Horry County, and is used for municipal, industrial, and domestic supplies. Almost all of the higher capacity wells (i.e., 100,000 gallons per day [gpd] or more) and many low capacity wells in the Myrtle Beach Area are completed into the Black Creek aquifer. These wells are screened primarily in the sand-rich zones that are situated throughout a 300- to 800-foot-depth interval. As shown in Figure 3.1.3-1, there are at least six wells within Myrtle Beach AFB boundaries, and at least 12 wells adjacent to base boundaries that draw upon the Black Creek aquifer system. Table 3.1.3-2 contains a listing and detailed description of the water wells shown in Figure 3.1.3-1.

Development of the Pee Dee aquifer system for domestic supplies tends to be localized, with more widespread use being primarily related to irrigation. This aquifer could probably supply as much water as the Black Creek aquifer; however, large capacity wells have not been developed into the Pee Dee aquifer system because of the variable groundwater quality.

The shallow artesian and water table aquifer system is thought to be tapped by many domestic wells throughout the area for the relatively large volumes of water for irrigation and domestic uses. Figure 3.1.3-1 shows two wells at the Myrtle Beach Civil Jetport and five wells at the golf course used for irrigation, which are completed in the water table aquifer system at depths of 30 to 50 feet.

Within the boundaries of the Myrtle Beach AFB, there are four deep wells (completed to a depth of 400 feet or more) and seven shallow wells (completed to a depth of 50 feet or less) that are used for land irrigation. Myrtle Beach AFB wells No. 1, 3, 5, and 6 are in use at this time. Myrtle Beach AFB well No. 6 is a new public supply well replacing Myrtle Beach AFB well No. 2, which is no longer in use. The City of Myrtle Beach and Myrtle Beach AFB also have an emergency water connection which has been used on occasion by both parties in the past.

**Surface Water.** The Intracoastal Waterway and the Waccamaw and Pee Dee rivers provide the principal drainage within the Grand Strand and near-westward areas. Drainage flows southwestward into Winyah Bay. Figure 3.1.3-1 shows the base surface water features and drainage patterns. Drainage emanating from the northern and western portions of Myrtle Beach AFB enters the Intracoastal Waterway via small drainage ditches. The southern and eastern parts of Myrtle Beach AFB and along coastal margins of the Grand Strand are drained by small streams that flow directly to the Atlantic Ocean and discharge via swash channels and inlets. Extensive tidal marshlands are found along the coast and extend as much as 25 miles up the larger rivers. Fresh to brackish-water swamps and bogs are also common throughout the inland plains, especially in areas adjacent to small streams. These conditions, along with the potential for flooding during storms, have led to the development of an extensive system of man-made drainage ditches.

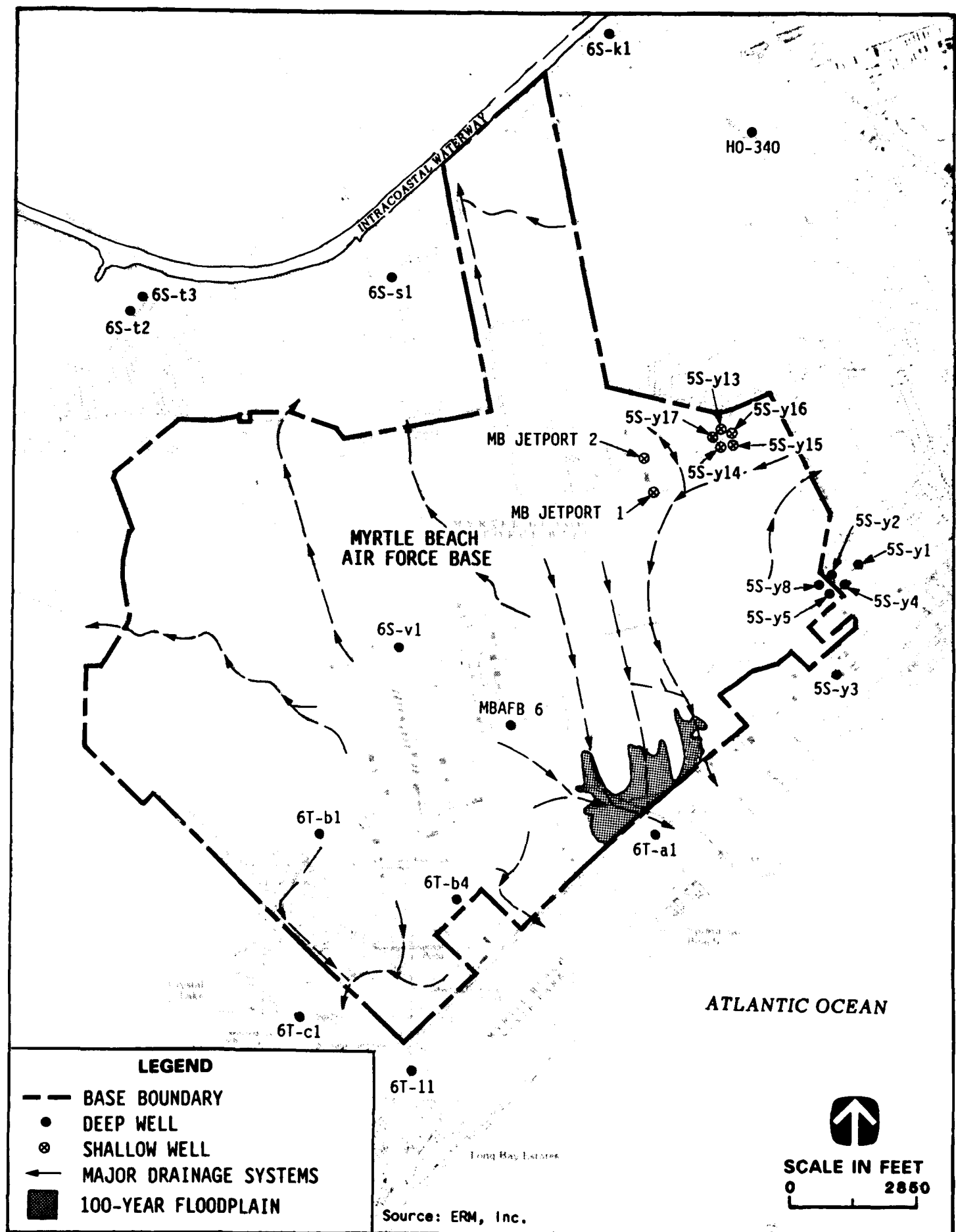


FIGURE 3.1.3-1 WATER RESOURCE FEATURES, MYRTLE BEACH AFB, SOUTH CAROLINA

Table 3.1.3-2

## Myrtle Beach AFB and Surrounding Area Water Well Information

SCWRC Well References	Well Use	Total Depth (ft)	Screened Interval (ft)	Approximate Pumping Rate (x 100 gpd)
6T-11	P.S.	746	308-638	691
6T-c1	P.S.	462	NA	288
6S-t2	P.S.	421	NA	79
6S-t3	P.S.	463	NA	288
6S-k1	P.S.	416	NA	30
5S-y1	P.S.	630	NA	576
5S-y2	P.S.	584	398-584	260
5S-y3	P.S.	674	NA	778
5S-y4	P.S.	575	NA	720
5S-y5	NA	572	506-560	NA
5S-y8	NA	214	108-214	NA
6T-a1	P.S.	718	NA	748
6T-b1	P.S.	760	512-756	5328
6T-b4	P.S.	787	553-787	5760
6T-b3	NU	NA	NA	NA
6S-u2	P.S.	632	350-632	5212
6T-v1	P.S.	794	100-790	7344
MBAFB 6	P.S.	NA	NA	NA
NA	NA	804	403-707	NA
NA	NA	42	32-34	NA
NA	P.S.	32	unknown	NA
MB Jetport 1	IRRIG.	35	unknown	NA
MB Jetport 2	IRRIG.	35	unknown	NA
5S-Y13	IRRIG.	50	unknown	580
5S-Y14	IRRIG.	50	unknown	580
5S-Y15	IRRIG.	50	unknown	580
5S-Y16	IRRIG.	50	unknown	580
5S-Y17	IRRIG.	50	unknown	610

NU - No longer in use  
NA - Not Available

P.S. - Public Supply  
IRRIG. - Landscape Irrigation

Monthly surface water samples are collected at various stations along the Intracoastal Waterway by the South Carolina DHEC. Above the saltwater interface, the water in the Intracoastal Waterway is usually soft, generally of good quality, and suitable for domestic and general industrial use at all times, providing it is treated for iron when necessary.

South Carolina DHEC has primary regulatory responsibility for maintaining water quality in the Myrtle Beach AFB area. The Water Classification and Standards System (South Carolina DHEC 1985), under Regulation 68, sets forth the authority for the assignment of stream classifications for all state waters and the adoption of applicable standards. These standards are subject to periodic review, or on an interim basis where circumstances warrant. The existing standards applicable to the classified waters adjacent to Myrtle Beach AFB are summarized as follows:

- Coastal areas of Horry and Georgetown counties are classified "SA," i.e., total saltwaters suitable for propagation, survival, and harvesting of shellfish for market purposes.
- The Intracoastal Waterway from its confluence with the Waccamaw River to a point where chloride concentrations exceed 250 mg/l (approximately where U.S. 17 crosses the Waterway) is classified "A," i.e., water suitable for direct contact use.
- Unnamed tributaries that may originate seasonally on the base, but do not possess individual classifications, must meet the classification standards of the receiving waters.

While there are no streams or rivers on Myrtle Beach AFB, many drainage ditches exist. A number of these ditches carry water at all times because of the depth of the ditch and the high water table in the area. Several ditches, which run past base industrial areas and are potentially exposed to sources of contamination, empty into either the Atlantic Ocean or Intracoastal Waterway. To comply with the requirements of the Clean Water Act, Myrtle Beach AFB applied for and was issued a National Pollutant Discharge Elimination System (NPDES) Permit, No. SC0002097, on July 1, 1983, which required four of these ditches to be monitored quarterly. An additional five ditches are also monitored quarterly to ensure that no pollutant discharges occur undetected.

### **3.1.3.3 Air Quality**

The South Carolina DHEC regulates and monitors for compliance with South Carolina Ambient Air Quality Standards (AAQS) and the federal National Ambient Air Quality Standards (NAAQS) under authority of the EPA.

**Existing Regional Air Quality.** Air quality in Horry County and the Myrtle Beach AFB area is in attainment with the State of South Carolina AAQS and the NAAQS for all criteria pollutants, including particulate matter smaller than 10 microns (PM<sub>10</sub>), which replaced total suspended particulates (TSP) as the national criterion for particulate matter in 1987; sulfur oxides (SO<sub>x</sub>); carbon monoxide (CO); nitrogen oxides (NO<sub>x</sub>); ozone (O<sub>3</sub>); and lead. Only ambient concentrations of TSP and lead have been monitored in the Myrtle Beach area by the South Carolina DHEC. The results of this monitoring, and corresponding state and national standards, are shown in Table 3.1.3-3. Horry County has never had an air pollution episode alert or an air stagnation warning.

**Air Pollutant Emission Sources.** The air pollutant emission sources at Myrtle Beach AFB are listed in Table 3.1.3-4. The major sources of air emissions are transportation and aircraft activities. As

Table 3.1.3-3

**Criteria Air Pollutant Concentrations  
Horry County, South Carolina**

Pollutant	Averaging Time	1987 Concentration	<u>Ambient Air Quality Standards</u>	
			South Carolina	National
Ozone	1 hour	NM	0.12 ppm 235 $\mu\text{g}/\text{m}^3$	0.12 ppm
Carbon Monoxide	8 hour	NM	9 ppm 10 $\mu\text{g}/\text{m}^3$	9 ppm
	1 hour	NM	35 ppm 40 $\mu\text{g}/\text{m}^3$	35 ppm
Nitrogen Dioxide	Annual Average	NM	0.05 ppm 100 $\mu\text{g}/\text{m}^3$	0.053 ppm
Sulfur Dioxide	Annual Average	NM	0.03 ppm 80 $\mu\text{g}/\text{m}^3$	0.03 ppm
	24 hour	NM	0.14 ppm 365 $\mu\text{g}/\text{m}^3$	0.14 ppm
PM <sub>10</sub>	3 hour	NM	0.05 ppm	None
	24 hour	NM	150 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$
	Annual Geometric Mean	NM	50 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$
	Annual Geometric Mean	32 $\mu\text{g}/\text{m}^3$	75 $\mu\text{g}/\text{m}^3$	None
Lead	Quarterly Arithmetic Mean	0.01 $\mu\text{g}/\text{m}^3$	1.5 $\mu\text{g}/\text{m}^3$	1.5 $\mu\text{g}/\text{m}^3$

NM = Not Measured

Source: ERM 1990.

expected from transportation sources, CO comprises the largest percentage of pollutants, followed by hydrocarbons (HC) and NO<sub>x</sub>. Approximately 932 tons of CO, 557 tons of HC, and 134 tons of NO<sub>x</sub> were emitted by the base in 1988. Table 3.1.3-5 shows the estimated emissions resulting from both civil and military aircraft flying operations at Myrtle Beach AFB/Jetport. Table 3.1.3-6 shows emissions from various sources in Horry County. Myrtle Beach AFB produces from 0.04 to 6.39 percent of total county emissions, depending on pollutant.

Table 3.1.3-4

**Air Pollutant Emissions From  
Myrtle Beach AFB, South Carolina, for Calendar Year 1988**

Source	Pollutant (Tons/Yr)				
	TSP	CO	SOx	NOx	HC
A. Incinerators	0.075	0.078	0.0098	0.014	0.058
B. Firefighting	0.11	0.49	0.00033	0.0036	0.28
C. Heating & Power Production					
1. Fuel Oil/LP	0.62	1.6	47	6.5	0.23
2. Gasoline	0.00097	0.59	0.00079	0.015	0.19
3. Diesel	0.097	0.017	0.09	1.4	0.11
D. Surface Coating	0	0	0	0	9.8
E. Aerospace Ground Equipment					
1. JP-4	0.21	0.64	0.39	2.9	0.2
2. Diesel	0.12	0.37	0.11	1.7	0.11
3. MOGAS	0.41	249	0.33	6.4	9.3
F. Fuel Evaporation Losses (transfer & storage)					
1. BX Gas Station	0	0	0	0	9.1
2. Supply Gas Station	0	0	0	0	2.2
3. Tank Farm Aircraft	0	0	0	0	56
G. Aircraft Flying Operations	4.2	628	11	107	461
H. Aircraft Ground Operations					
1. Engine Runups	0.00094	0.31	0.019	0.17	0.082
2. TRIMS/Power	0.0016	0.54	0.034	0.3	0.15
I. Motor Vehicles	1.3	0.5	0.06	7.6	8.5
<b>TOTAL:</b>	<b>7.2</b>	<b>932</b>	<b>59</b>	<b>134</b>	<b>537</b>

Source: Air Pollutant Emissions Inventory, Myrtle Beach AFB, 1988.

### 3.1.3.4 Noise

The airfield at Myrtle Beach AFB is a joint-use facility for both military and civil air traffic operations. The civil airport terminal and related facilities, located east of the runway, is owned and operated by the Horry County Department of Airports.

Noise results are expressed in terms of  $L_{dn}$  using decibels (dB) on an A-weighted scale as units. The  $L_{dn}$  is the A-weighted average noise level over a 24-hour period. Figure 3.1.3-2 presents maximum A-weighted sound levels of common noise sources. The A-scale gives an approximation of the human ear's response to noise and also correlates with a person's judgment of the loudness of a noise event.

Table 3.1.3-5

**Estimated Current Aircraft Operations Emissions  
At Myrtle Beach AFB/Jetport  
(tons per year)**

Source	Particulates	CO	SO <sub>x</sub>	NO <sub>x</sub>	HC
Military Aircraft <sup>1</sup>	4.2	628	11	107	461
Commercial Aircraft <sup>2</sup>	5.3	228	9.2	80	116
<b>TOTAL:</b>	<b>9.5</b>	<b>856</b>	<b>20.2</b>	<b>187</b>	<b>577</b>

Notes: <sup>1</sup>Based on Air Pollution Emission Inventory for CY88, Myrtle Beach AFB, South Carolina (January 1989).

<sup>2</sup>Based on 1987 commercial aircraft operations in "Environmental Assessment for Amendment of the Joint Agreement on MBAFB" (LPA Group 1989).

See Table 4.1.3-3.

Table 3.1.3-6

**Horry County, South Carolina  
Air Pollutant Emissions Inventory  
1988  
(tons per year)**

Emission Source	Particulates	CO	SO <sub>x</sub>	NO <sub>x</sub>	HC
Fuel Combustion	443	2,180	12,492	4,040	735
Industrial Process	4	6	0	385	5
Solid Waste Disposal	276	1,365	9	61	437
Transportation	2,306	19,316	356	4,551	3,786
Miscellaneous	14,006	5,340	7	188	2,909
Myrtle Beach AFB	7.2	932	59	134	537
(Percent of Total)	(0.04)	(3.20)	(0.46)	(1.43)	(6.39)
<b>TOTAL:</b>	<b>17,042</b>	<b>29,139</b>	<b>12,923</b>	<b>9,359</b>	<b>8,409</b>

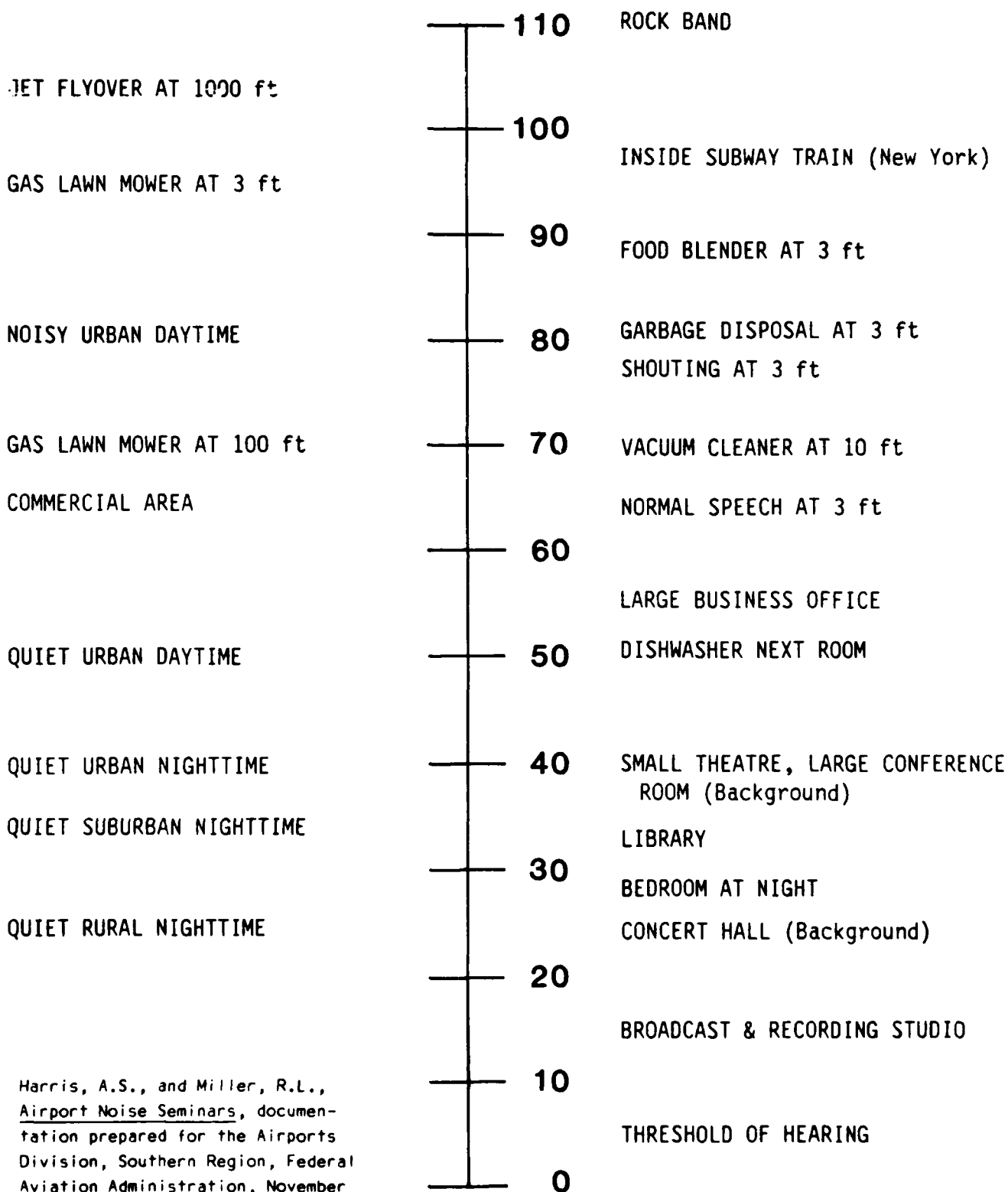
Source: Environmental Protection Agency 1988.

L<sub>dn</sub> values are used by the EPA, the U.S. Department of Housing and Urban Development (HUD), and the DOD to describe noise exposure. In calculating L<sub>dn</sub> levels, noise levels from aircraft operations that occur between 10 P.M. and 7 A.M. are artificially increased by 10 dB. This weighting reflects the added intrusiveness of nighttime noise events attributable to the fact that community background noise levels typically decrease about 10 dB at night. At Myrtle Beach AFB, however, the airfield is normally closed between midnight and 6:00 A.M., and military operations are not normally conducted before 7:00 A.M.

# COMMON OUTDOOR NOISE LEVELS

# NOISE LEVEL dB(A)

# COMMON INDOOR NOISE LEVELS



Source: Harris, A.S., and Miller, R.L., Airport Noise Seminars, documentation prepared for the Airports Division, Southern Region, Federal Aviation Administration, November 1977.

FIGURE 3.1.3-2 COMMON NOISE LEVELS, IN dBA

The existing noise conditions at Myrtle Beach AFB were recently (1990) determined by the Air Force Engineering and Services Center and base operations and maintenance personnel. Noise levels generated by aircraft activities at Myrtle Beach AFB were estimated using the NOISEMAP computer model (Version 5.2). This version of NOISEMAP is one of two models approved by the FAA for airport noise modeling. The model incorporates a comprehensive set of computer routines for calculating noise exposure contours around airports. The FAA has certified that the model computes noise levels that are essentially identical to those provided by Version 3.9 of the FAA's own Integrated Noise Model.

The noise levels estimated by NOISEMAP for Myrtle Beach AFB and the Jetport were based on current aircraft noise and performance data and aircraft operational data. In addition, aircraft noise data were obtained for typical thrust settings used on takeoff, landing, level flight, and when conducting closed patterns and low pass training operations. Aircraft performance data define takeoff roll, rate of climb, altitude and speeds at different distances from takeoff, etc. Aircraft operational data included runway utilization rates; typical flight track descriptions and utilization rates; level and mix of aircraft operations; and day-night split of operations (by aircraft type). Also included in the noise analysis were engine testing and maintenance procedures conducted at various stationary locations around the airfield.

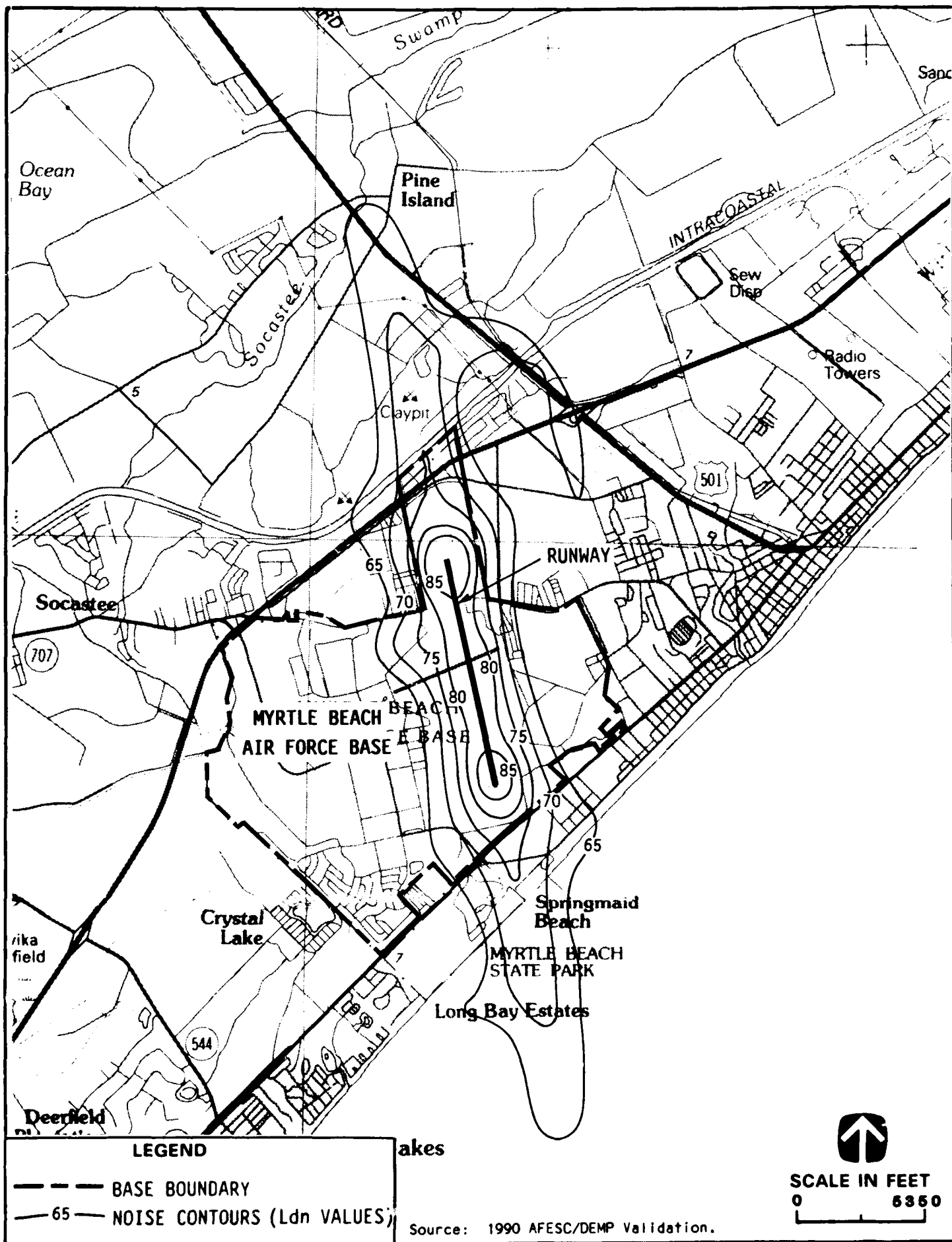
The NOISEMAP model calculates  $L_{dn}$  values in decibels and plots a contour of the noise "footprint." Figure 3.1.3-3 depicts the noise environment estimated by the NOISEMAP model for current Myrtle Beach AFB and Jetport aircraft operations. Noise contours are plotted with a minimum  $L_{dn}$  value of 65 dB since studies have determined that the percentage of persons highly annoyed increases rapidly above this level. No onbase residential areas are exposed to  $L_{dn}$  65 dB, but off residential areas are exposed to  $L_{dn}$  65 to 70 dB (143 acres) and  $L_{dn}$  70 to 75 dB (52 acres). An estimated 300 persons reside in these two areas.

Another noise source in the Myrtle Beach area is vehicular traffic. Noise monitoring data are not available for the Myrtle Beach AFB vicinity. However, levels of  $L_{dn}$  60 to 65 dB were estimated for the segments of U.S. 17 and U.S. 17 Business adjacent to the base (outside the runway noise contours), using the FAA noise model STAMINA and current traffic volumes for these roadways (Section 3.1.1.3).

#### 3.1.3.5 Biological Resources

**Vegetation.** Since establishment of Myrtle Beach AFB in the early 1940s, man's activities have been the primary influence on vegetative patterns within the installation boundaries. Habitat types onbase are primarily limited to disturbed or maintained, grassy or mixed herbaceous areas, mixed pine-hardwood forest, and scattered areas of palustrine wetlands. The base covers approximately 3,793 acres, 1,553 acres of which are developed land and consist of nonnatural land uses such as buildings, runways, parking lots, etc. Approximately 1,150 acres are undeveloped woodland or shrub-scrub habitat. The remaining 1,090 acres are adjacent to runways and between improved and unimproved land, and are kept in a semi-improved state. Vegetation in these areas is maintained at heights between 3 and 8 inches.

Mixed herbaceous areas at Myrtle Beach AFB may contain a variety of grasses, goldenrod (*Solidago* spp.), asters (*Asteraceae*), broomsedge (*Andropogon virginicus*), and in moister soils, sedges (*Carex* spp., *Cyperus* spp., and *Scirpus* spp.). Since vegetation height in these areas is typically maintained, species diversity is relatively low. Field surveys in these areas have not been conducted; consequently, species composition is only speculative. Forested areas onbase are typically mixed pine-hardwood forests, consisting of loblolly pine (*Pinus taeda*), long-leaf pine (*P. palustris*), turkey oak (*Quercus*



**FIGURE 3.1.3-3 AIRCRAFT NOISE CONTOURS, MYRTLE BEACH AFB, SOUTH CAROLINA, 1990**

*laevis*), southern red oak (*Q. falcata*), post oak (*Q. stellata*), poplar *Populus* sp.), and sweetgum (*Liquidambar styraciflua*). Common understory species are red bay (*Persea borbonia*), sweetbay (*Magnolia virginiana*), American holly (*Ilex opaca*), and wax myrtle (*Myrica cerifera*). Frequently encountered herbaceous species in mixed pine-hardwood forests are Virginia chain-fern (*Woodwardia virginica*), netted chain-fern (*W. aerolata*), royal fern (*Osmunda regalis*), poison ivy (*Toxicodendron radicans*), and cane (*Arundinaria gigantea*). Common vines are yellow jasmine (*Gelsemium sempervirens*), Virginia creeper (*Parthenocissus quinquefolia*), muscadine (*Vitis rotundifolia*), catbrier (*Smilax* sp.), and honeysuckle (*Lonicera japonica*). These forests have been timbered in the past, with little or no management until 1968, at which time the U.S. Department of Agriculture, Soil Conservation Service, assisted in preparing a conservation plan. This plan recommended timber harvesting, prescribed burning, and drainage ditch construction in order to improve wildlife habitat.

**Wildlife.** Habitat management on base has been sporadic since the Soil Conservation Service management plan was recommended in 1968. Two acres of permanent wildlife food plots were sown in bicolor lespedeza (*Lespedeza* sp.) and white clover (*Trifolium repens*) to provide forage and habitat diversity. Over the years there has been selective timber harvesting and prescribed burning on an irregular basis. Consequently, the majority of the wildlife habitat on base is of limited quality. No extensive population surveys have been conducted in the past and data on species occurrence on base are extremely limited. Species that have been reported or are most likely to occur on base are the gray squirrel (*Sciurus carolinensis*), white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphi virginiana*), house mouse (*Mus musculus*), great blue heron (*Ardea herodias*), mallard (*Anas platyrhynchos*), northern bobwhite (*Colinus virginianus*), killdeer (*Charadrius vociferus*), and various songbirds, turtles, frogs, and snakes. The managed freshwater ponds have been stocked with largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and redear sunfish (*L. microlophus*). There are seven managed fish ponds on base which vary in size from 0.5 to 5 acres, totaling nearly 16 acres.

**Wetlands.** The U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) map indicates a total of 300 acres of wetland scattered throughout the base, the majority of which are classified as Palustrine Systems. There are three major types of palustrine wetlands: emergent, scrub-shrub, and forested wetland. By definition, Palustrine Systems include "all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity, due to ocean-derived salts is below 0.5 parts per hundred (pph). This system also includes areas lacking such vegetation, but with all of the following characteristics: (1) area less than 20 acres; (2) wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than two meters at low water; and (4) salinity due to ocean-derived salts less than 0.5 pph" (Cowardin et al. 1979). Both emergent and forested palustrine wetlands have been mapped on base. Although species surveys of the palustrine wetlands have not been conducted, emergent wetlands are typically dominated by herbaceous vegetation, including certain grasses, cattails, rushes, and sedges. In the Southeast, palustrine forested wetlands that are flooded only briefly during the growing season are characterized by sweet gum, loblolly pine, tulip poplar (*Liriodendron tulipifera*), beech (*Fagus* sp.), sycamore (*Platanus occidentalis*), hickory (*Carpa* sp.), and various oaks. These areas contain pine, oak, and some bald cypress (*Taxodium distichum*).

The NWI map indicates two types of Riverine Systems on Myrtle Beach AFB -- tidal and lower perennial wetlands. The Riverine Systems include all wetlands and deepwater habitats contained within a channel, except those habitats with water-containing ocean-derived salts in excess of 0.5 pph, or wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. The lower perennial wetlands on base are constructed ditches which typically contain 1 to 2 feet of water. The "tidal wetland" is also a man-constructed feature which shows little or no tidal influence. The USFWS's NWI Myrtle Beach map was prepared primarily by stereoscopic analysis of high altitude aerial photographs. In most cases, there is no ground-truthing of mapped wetlands.

If land use on base changed so that any of the "wet" areas would be affected, jurisdictional wetlands would need to be identified and their upper boundaries delineated. The USFWS, EPA, Department of the Army, and Soil Conservation Service have developed a technique for identifying and delineating jurisdictional wetlands. Based on their mandatory technical criteria for wetland identification, wetlands possess three essential characteristics: hydrophytic vegetation, or wetland indicator species; hydric soils; and wetland hydrology. The three technical criteria are mandatory and must all be met for an area to be identified as a wetland (Federal Interagency Committee for Wetland Delineation 1989).

**Threatened and Endangered Species.** Threatened and endangered plant and animal species potentially occurring on or near Myrtle Beach AFB are listed in Table 3.1.3-7. Of the federally listed species, only the American alligator (*Alligator mississippiensis*) has been documented within installation boundaries in the past. No other threatened or endangered species are known or considered likely to occur on the base.

The American alligator, listed as threatened because of its similarity of appearance to the American crocodile (*Crocodylus acutus*), inhabits freshwater rivers, lakes, swamps, and marshes, occasionally entering brackish or salt water. Their range in the coastal plain extends south from the Albemarle Sound into southern Florida. Alligators occur periodically in ponds and ditches on base, but have not been documented in recent years.

The South Carolina Nongame and Endangered Species Conservation Act (Chapter 15, 50-15-10 et seq.) provides that endangered species or subspecies of wildlife indigenous to South Carolina should be afforded protection in order to maintain, and to the extent possible, enhance, their numbers. Additionally, it is unlawful to take, deal in, or transport species on the state list. At present, only animal species are officially listed by the South Carolina Wildlife and Marine Resources Department. No state-listed animals or state-concern plants have been documented on Myrtle Beach AFB. Officially listed threatened and endangered animal species that occur in the vicinity of the base are listed in Table 3.1.3-7.

#### **3.1.3.6 Cultural and Paleontological Resources**

A cultural resources inventory was conducted by the Carolina Archeological Services (CAS) for Myrtle Beach AFB in 1979. The survey included surface inspection, subsurface testing, deep auguring, and a historical structures survey. Approximately 91 percent (3,400 acres) of Myrtle Beach AFB, including all of the undeveloped portions of the base, was investigated. A total of 14 archaeological sites, as well as 17 isolated artifact finds, were recorded. Of these, four military structures and one late historic complex were considered to have exceptional educational and contextual value which would make them eligible for nomination to the National Register of Historic Places (NRHP).

**Prehistoric Resources.** Twelve of the 14 archaeological sites recorded on the base contain the remains of prehistoric occupations, ranging in age from the Middle Archaic to Woodland periods. The sites consist of sparse lithic and/or ceramic scatters which appear to be badly disturbed by subsequent historic occupation and erosion. None of the prehistoric sites were identified as having sufficient integrity and research potential to qualify for the NRHP.

Table 3.1.3-7

**Threatened and Endangered Species Potentially  
Occurring Near Myrtle Beach AFB**

Common Name	Scientific Name	Status		Comments/Habitat
		Federal	State	
ANIMALS				
• Black Bear	<i>Ursus americanus</i>		T	In the coastal plain, occurs in large tracts of swamp, pocosins, and flatwoods.
West Indian (Florida) Manatee	<i>Trichechus manatus</i>	E	E	Documented in Myrtle Beach coastal waters.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	E	E	Occurs nationwide near seacoasts, rivers, and large lakes. Does not occur in Myrtle Beach area at present.
Golden Eagle	<i>Aquila crysacetos</i>		E	A rare fall transient and winter visitor in South Carolina.
Peregrine Falcon	<i>Falco peregrinus</i>	E(S/A)	E(S/A)	Very rare in eastern U.S. Arctic peregrines are occasional migrants along East Coast.
Cooper's Hawk	<i>Accipiter cooperii</i>		T	An uncommon winter resident that inhabits dense woods and adjacent edges.
Swallow-tailed Kite	<i>Elanoides forficatus</i>		E	An uncommon breeding summer resident that inhabits dense woodlands, river bottoms, and cypress lagoons.
• Osprey	<i>Pandion haliaetus</i>		T	Commonly breed on or near the coast, but rare in winter.
Piping Plover	<i>Charadrius melodus</i>	E	E	Occurs along beaches and barrier islands. Rare inland. Not expected to occur in Myrtle Beach area.
Ipswich Sparrow	<i>Passerculus sandwichensis princeps</i>		E	Restricted to sand dune habitat along the Atlantic East Coast.
Wood Stork	<i>Mycteria americana</i>	E	E	Common in coastal South Carolina.
• Least Tern	<i>Sterna antillarum</i>	E	E	A fairly common summer resident along the coast where it nests on beaches and dredge spoil islands.
Bachman's Warbler	<i>Vermivora bachmanii</i>	E	E	Timbered swamps with abundant water. Unlikely in Myrtle Beach area.
Kirtland's Warbler	<i>Dendroica kirtlandii</i>	E	E	Nest in Michigan. Rare migrant in the Carolinas.

Table 3.1.3-7, Page 2 of 2

Common Name	Scientific Name	Status		Comments/Habitat
		Federal	State	
ANIMALS (CONTINUED)				
Red-cockaded Woodpecker	<i>Picoides borealis</i>	E	E	Known in Horry County; nests in pine trees.
American Alligator	<i>Alligator mississippiensis</i>	T	T	Observed on Myrtle Beach AFB in the past.
Green Sea Turtle	<i>Chelonia mydas</i>	T	T	Uncommon in South Carolina's coastal waters.
Kemp's Ridley Sea Turtle	<i>Lepidochelys kempii</i>	E	E	Uncommon in South Carolina's coastal waters.
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	E	E	Occurs in South Carolina's coastal waters.
Loggerhead Sea Turtle	<i>Caretta caretta</i>	T	T	Common in South Carolina's coastal waters.
PLANTS				
* Harper's Fimbristylis	<i>Fimbristylis perpusilla</i>	2		Occurs along alluvial borders of pineland ponds.
* Schweinitz' Sunflower	<i>Helianthus schweinitzii</i>	2		Inhabits clearings and borders of upland woods in the coastal plain and piedmont of South Carolina.
* Carolina Lilaeopsis	<i>Lilaeopsis carolinensis</i>	3C		In coastal plains, found in shallow freshwater pools, ditches, marshes, and muddy shores.
* Godfrey's Sandwort	<i>Minuartia godfreyi</i>	3C		Occurs in seepage areas, wet woodlands clearings of flatwoods, and adjacent ditches in the coastal plain.
Carolina Grass-of-parnassus	<i>Parnassia caroliniana</i>	2		An inhabitant of coastal plain savannahs, bogs, and flatwoods.
* Chaffseed	<i>Schwalbea americana</i>	1		Found in moist to dry pinelands, oak woodlands, and seasonally wet pine savannahs.

\*Species has been documented in Horry County, South Carolina.

- Status Notes: 1 - Taxa for which the U.S. Fish and Wildlife Service has enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
- 2 - Taxa for which there is some evidence of vulnerability but for which there are not enough data to support listing proposals at this time.
- 3C - Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat.
- E - Endangered
- T - Threatened
- S/A - Species that are sufficiently similar in appearance to endangered or threatened species.

Sources:

U.S. Department of the Interior, Fish and Wildlife Service 1987; U.S. Department of the Interior, Fish and Wildlife Service 1990; Katherine Boyle, Data Manager, South Carolina Heritage Trust Program, South Carolina

Wildlife and Marine Resources Department, personal communication, 9 April 1990; Radford et al. 1968; Potter et al. 1990; Webster et al. 1985.

**Historic Resources.** Four of the archaeological sites contain historic components representing mid-19th to early-20th century homesteading activities. These sites are not considered historically important because they have been destroyed by subsequent development or lack stratigraphic integrity.

The CAS historical resources survey resulted in the identification of four standing structures and one late historic complex at Myrtle Beach AFB believed to have potential for listing on the NRHP. The one nonmilitary structure of the group is an extensively modified shed used by the Civilian Conservation Corps (CCC) during the 1930s and now integrated as part of the family camping area of Myrtle Beach AFB. This structure, and three mortared heating troughs and a pumphouse built by the CCC, are considered to have sufficient integrity of setting, feeling, and association to merit eligibility to the National Register.

The other three structures and historic complex identified in the survey are military in nature and origin: one prefabricated metal aircraft hangar (Butler hangar) and two concrete Norden bomb sight vaults, considered as a single structural type; and the original World War II aircraft parking and cantonment area. Since the time of the original study in 1980, however, the Butler hangar was determined by the base and State

Historic Preservation Officer (February 27, 1989) to have no historical value. The two Norden bomb sight vaults are currently not used and in disrepair, but appear to have local associational and educational significance and integrity that would qualify them as properties eligible for the National Register. The historic complex is the extensive remnants of the World War II aircraft parking (revetment) and the original cantonment area of Myrtle Beach General Bombing and Gunnery Range. The revetment system is well-mapped and generally well-preserved; however, the cantonment area is unevenly preserved and less documented. The World War II complex has undergone modification of varying degrees over the years, but still displays integrity of setting and association with significant historical events to be considered potentially eligible for the National Register. Formal evaluations and determinations of NRHP eligibility have not yet been initiated.

***Paleontological Resources.*** The geologic sequence in the Myrtle Beach area consists of Pre-Cretaceous crystalline rocks overlain by some 1,200 feet of sands, clays, sandstones, marl, and calcareous limestones. Fossil-bearing units include the late Miocene Duplin Formation, the Pliocene Bear Bluff Formation, and the Pleistocene Waccamaw Formation. Of these, the Duplin Formation is perhaps the most productive, as it contains abundant, well-preserved fossils rich in *Ostrea* and *Pecten* species. In the generalized stratigraphy of Horry County, the fossiliferous formations occur at depths of at least 50 feet below the surface. There are no surface bedrock exposures in the vicinity of the beach, and therefore, no paleontological localities on the base.

## **3.2**

### **DAVIS-MONTHAN AIR FORCE BASE, ARIZONA**

Davis-Monthan AFB is a Tactical Air Command (TAC) base with a long and varied history. It was established as an aviation facility in 1927 when Colonel Charles A. Lindbergh dedicated Tucson's new airport as Davis-Monthan Field, named in tribute to two local military aviators: Lieutenants Samuel H. Davis and Oscar Monthan. It was the nation's largest municipal airport, and later that year became a military refueling and service depot.

In 1940 Davis-Monthan AFB officially became an Army Air Base with a grant of 16,000 acres from the City of Tucson. Throughout World War II, there was tremendous facilities expansion, the number of assigned personnel grew to 10,300, and the base became one of the key installations for training medium and heavy bombardment units.

Davis-Monthan AFB became a Strategic Air Command (SAC) base in 1947. In the same year, the Air Technical Service Command Storage Area was established at Davis-Monthan AFB for aircraft storage, reclamation, and disposal operations. This facility, now designated AMARC (Aerospace Maintenance and Regeneration Center), is still based at Davis-Monthan AFB and includes over 3,000 aircraft. Approximately 70 percent of these aircraft are reused in some manner.

In 1951, Davis-Monthan AFB became the home of the 36th Air Division, which still serves as the base's host unit, now designated the 836th Air Division. In 1962, Davis-Monthan AFB became the home of a Titan II Intercontinental Ballistic Missile (ICBM) Wing, the 390th Strategic Missile Wing. The 355th Tactical Fighter Wing (355th TFW) was reactivated at Davis-Monthan AFB in 1971 and equipped with the A-7D Corsair II fighter. In 1976, the 355 TFW began the transition to the A-10A close-in air support fighter, which it still flies today. The 355th TFW was redesignated the 355th Tactical Training Wing (355th TTW) in 1979. Deactivation of the Titan II missile wing began in 1982 and was completed in 1984.

In 1981, the 868th Tactical Missile Training Squadron (868th TMTS) was formed and based at Davis-Monthan AFB. In 1983, the 868 TMTS graduated its first class of launch officers, flight commanders, and maintenance technicians for the Ground-Launched Cruise Missile (GLCM). In 1986, the 868th TMTS was elevated to a group (868th TMTG). Since 1988, Soviet teams have visited Davis-Monthan AFB periodically to conduct inspections in accordance with the Intermediate-Range Nuclear Forces (INF) Treaty. In 1990, the 868th TMTG graduated its last class and was deactivated per the INF. Davis-Monthan AFB was annexed by the City of Tucson in 1986.

#### **3.2.1 Local Community**

Davis-Monthan AFB is located on the southeastern limits of the City of Tucson in Pima County, Arizona (Figures 3.2.1-1 and 3.2.1-2). The only other incorporated city near the base is South Tucson (Figure 3.2.1-1). Unincorporated county land surrounds the base on the west, south, and east. San Xavier Indian Reservation is approximately 6 miles southwest of the base, the Saguaro National Monument is about 8 miles to the east, and the Mexican border is about 65 miles south.

Davis-Monthan AFB has a warm, semi-arid climate, characteristic of much of the southwestern United States. Climatic factors are largely influenced by a latitudinal high pressure zone, distance from major water bodies, and the presence of mountain ranges partially surrounding the base. Summer weather is dominated by convectional and orographic phenomena creating frequent, isolated thunderstorms, as well as infrequent tropical storms from the Pacific Ocean. The short winter is characterized by clear, mild weather with intermittent overcast periods and light rain caused by frontal activity. Snowfall is negligible in the Tucson Basin; however, an average of 75 inches per year falls at higher elevations in the Santa Catalina Mountains.

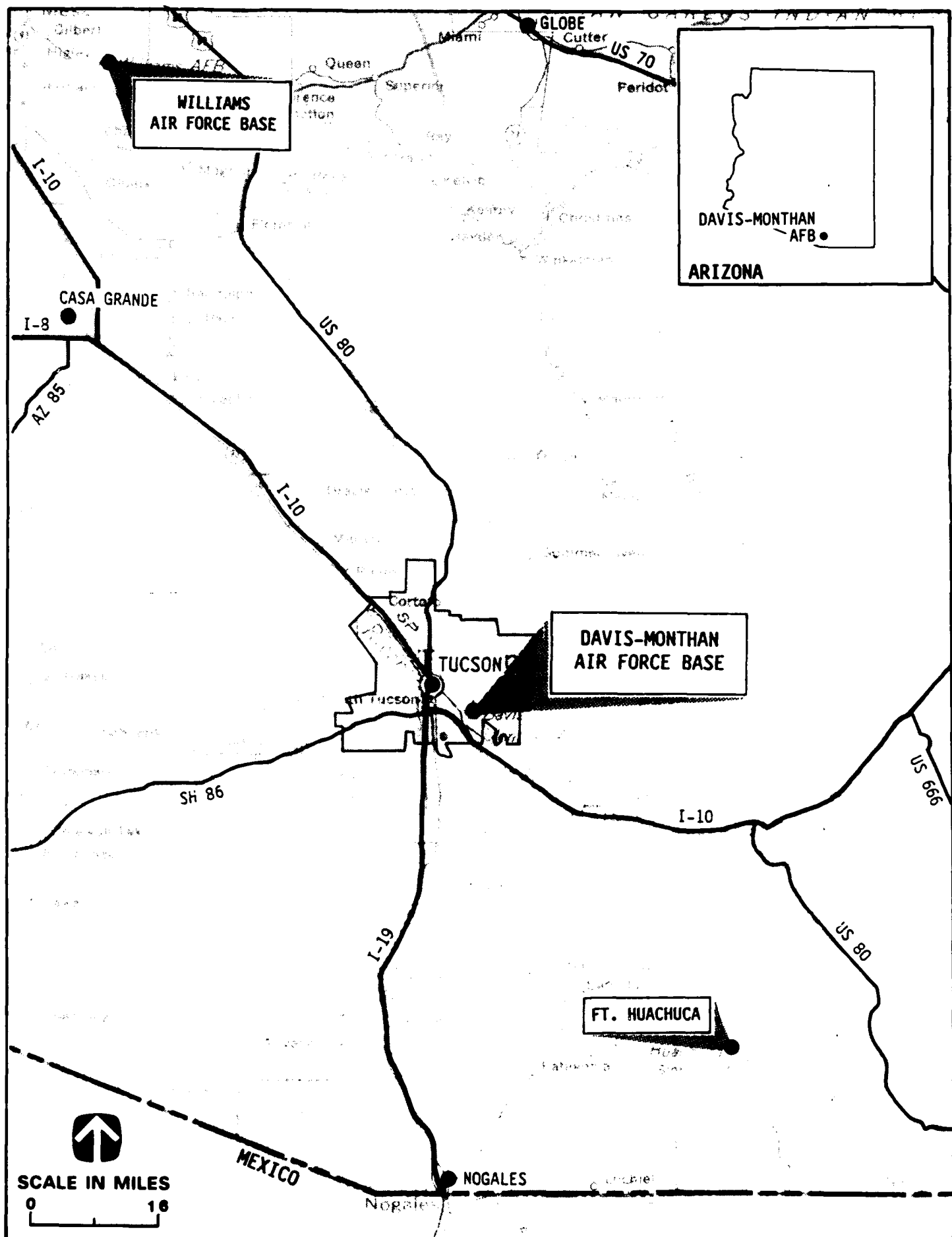


FIGURE 3.2.1-1 REGIONAL SETTING, DAVIS-MONTHAN AFB, ARIZONA

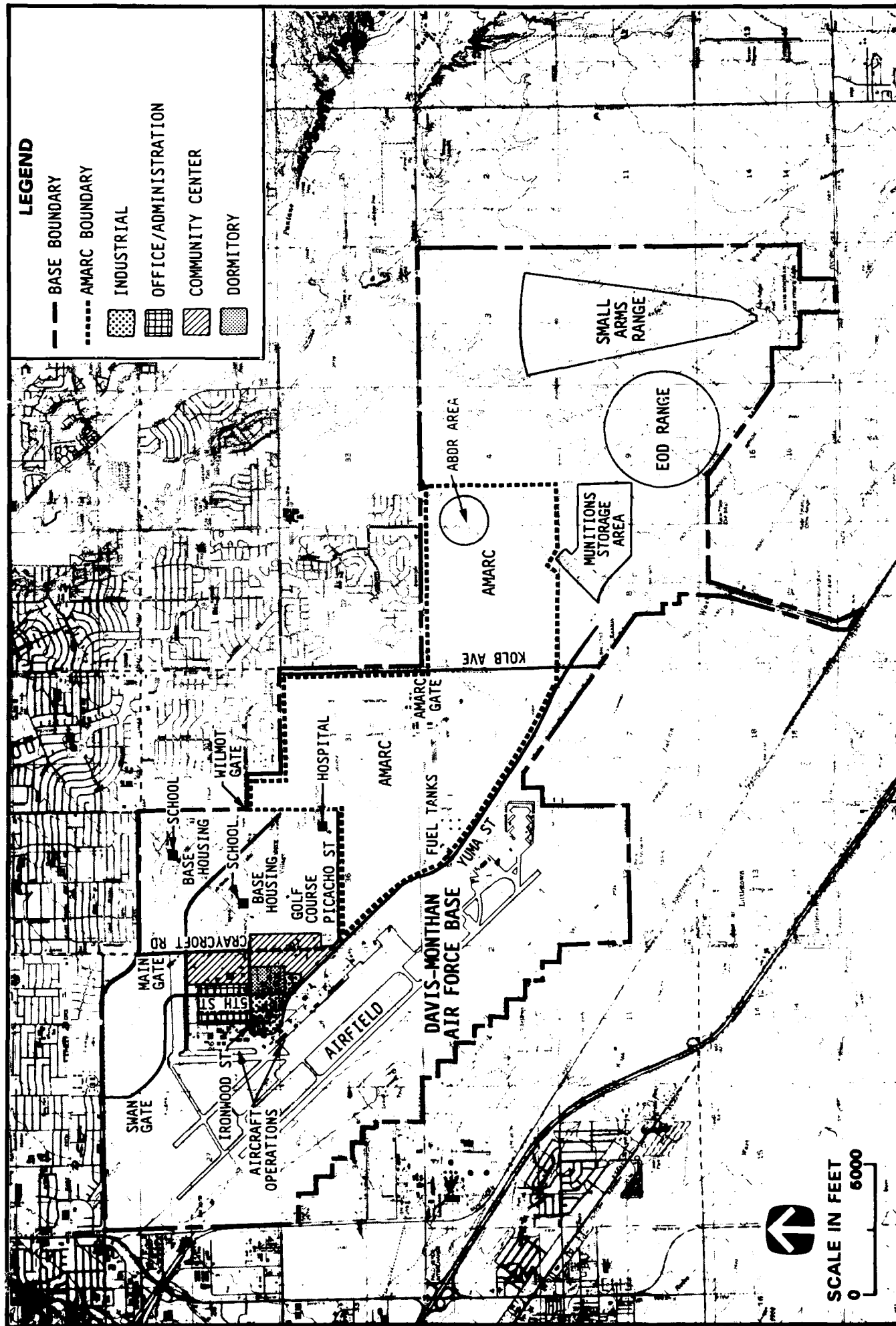


FIGURE 3.2.1-2 DAVIS-MONTHAN AFB, ARIZONA AND VICINITY

The annual average temperature for Davis-Monthan AFB is approximately 69°F, with average daily maximum and minimum temperatures of 81°F and 56°F, respectively. The long, hot season extends from April through October with an annual average of 41 days with maximum temperatures over 100°F. Some relief from high temperatures is provided by a low average relative humidity of 37 percent.

Annual potential evaporation greatly exceeds the annual precipitation in the Tucson Basin area. Precipitation at Davis-Monthan AFB averages about 11 inches per year, with nearly half this quantity falling between July and September when moist air from the Gulf of Mexico flows over Arizona. A secondary rainy season is centered around December, while the months of April, May, and June are typically the driest, with less than 0.5 inch of rainfall per month. The mean annual pan evaporation rate in the Tucson area is approximately 113 inches per year. The net precipitation for the Davis-Monthan AFB area (mean annual precipitation minus mean annual pan evaporation) is approximately -102 inches per year.

Davis-Monthan AFB is within the Sonoran Desert section of the Basin and Range Province of southern Arizona. The base lies in the Tucson Basin, which comprises an area of approximately 1,000 square miles in the upper Santa Cruz River drainage basin. The foothills and mountain ranges that border the basin range in elevations from 4,000 to 9,000 feet above MSL, and include the Santa Catalina Mountains to the north, Rincon Mountains to the east, and the Tucson Mountains to the west. Surface elevations in this area typically range from 2,550 feet to 2,900 feet above MSL. The land surface altitude of the downstream end of the basin is approximately 2,140 feet above MSL, sloping gently to the northwest.

#### **3.2.1.1 Community Setting**

At the end of fiscal year (FY) 1989, Davis-Monthan AFB employed a total of 5,393 military personnel, 1,444 appropriated fund civilian personnel, and 657 other civilian personnel (ERIS 1989). Approximately 41 percent of the military personnel live onbase and 59 percent live in communities near the base. The base population is 5,166, which consists of the military personnel and their dependents who live onbase. Approximately 13,000 military retirees live in Pima County. In addition to direct employment of civilians on the base, spending by the base and base employees provides secondary employment for approximately 4,100 other civilians in the local area.

As a result of fiscal and other constraints that are independent of base closure, personnel authorizations will be reduced over the next several years. By the last quarter of FY 1991, personnel authorizations will be reduced to 5,170 military and 1,660 civilian personnel. The actual numbers of personnel will probably be slightly lower than the authorizations. By FY 1992, secondary employment is projected to be 3,600 jobs.

The 1990 population of Tucson and Pima County are approximately 411,000 and 692,000, respectively (Pima County Association of Governments 1990). Arizona and the Tucson area were among the faster growing areas of the United States in the past two decades. The population of Pima County increased by 33 percent between 1978 and 1988. However, growth has slowed in the last few years. By the year 2000, the populations of Tucson and Pima County are expected to be approximately 487,000 and 877,000, respectively (Pima County Association of Governments 1990).

Total employment in Pima County was 310,000 in June 1989. Tucson has a diverse economy. The principal nonagricultural employment sectors are services, government, wholesale and retail trade, and manufacturing.

### 3.2.1.2 Land Use and Aesthetics

**Land Use.** Davis-Monthan AFB comprises 10,633 acres. Military land uses occur at the base on lands that are a combination of fee owned (2,056 acres), public domain (2,238 acres), leased from the City of Tucson and other parties (4,578 acres), land donated by the City of Tucson (1,756 acres), and land used on a permit from the U.S. Bureau of Land Management (5 acres). Land use on the base and in the immediate vicinity is shown in Figure 3.2.1-3. Residential housing on Davis-Monthan AFB consists of both accompanied and unaccompanied units. Accompanied housing consists of the Kachina Village Family Housing Area, containing 555 dwelling units; the Palo Verde Family Housing Area, containing 700 dwelling units; and a 102-space mobile home park. The unaccompanied enlisted housing consists of 10 dormitories and there are 4 visiting airman quarters and 2 visiting officers quarters. Facilities classified public/quasi-public at Davis-Monthan AFB include two elementary schools within the military housing areas. Cantonment land uses consist of administrative, community (excluding public schools), and medical facilities, which are primarily in the northern portion of the base east of the flightline.

The Aircraft Maintenance and Regeneration Center (AMARC) is the largest industrial facility at Davis-Monthan AFB. The AMARC is an aircraft storage and regeneration facility that serves the Air Force, DOD, and other federal, state, and local governmental agencies (Figure 3.2.1-2). The AMARC is on approximately 2,600 acres in the center of the base. The petroleum, oil and lubricants (POL) facility is between the flightline and AMARC. The base has an industrial area within the Base Support Area adjacent to the east side of the flightline. The Defense Reutilization and Marketing Office (DRMO) is within the AMARC area. The ordnance-related facilities onbase include special industrial areas consisting of the AMARC Storage Area, Aircraft Battle Damage Repair (ABDR) area, Explosive Ordnance Disposal (EOD) area, military small arms range, and the Munitions Storage Area (Figure 3.2.1-3). The airfield area includes the runways, landing pads, support facilities, and the surrounding aircraft operations area including Approach Zones, Clear Zones, and portions of APZ 1.

Open space areas include the undeveloped explosives safety zones surrounding the various ordnance-related facilities, and other undeveloped land. Onbase recreation facilities include a golf course, a skeet range, baseball diamonds, football/soccer fields, a swimming facility, and a riding club. The recreational facilities are generally concentrated in the cantonment area with the exception of those facilities requiring open space.

The urbanized area of the City of Tucson and unincorporated land of Pima County abut much of the northern and northwestern areas of Davis-Monthan AFB. A developing industrial area is adjacent to the western edge of the base. Commercial use consists of strip development along Interstate 10 south and west of the base and commercial centers within the urbanized area of Tucson on the north side of the base. Much of the area north of the base is predominantly devoted to residential use. Pockets of additional residential use are west of the base. Rita Ranch, a mixed use area, is developing southeast of the base. The land south and west of the base still contains large parcels of undeveloped open space land. The largest offbase open space land holdings are State of Arizona trust lands, which abut the east side of the base and total over 14 square miles. These lands are considered by the state legislature to be state urban lands held in trust for orderly and compatible development. Tucson International Airport is approximately 5 miles southwest of the base.

The *Davis-Monthan AFB Cornerstone 2000* is a long-range planning document that guides base physical facilities planning for the future by monitoring efficient and economical goals while protecting environmental and cultural resources. The plan emphasizes long-range planning to meet the development needs of the base and the surrounding community. The Air Installation Compatible Use Zone (AICUZ) program for Davis-Monthan AFB provides recommendations for land use

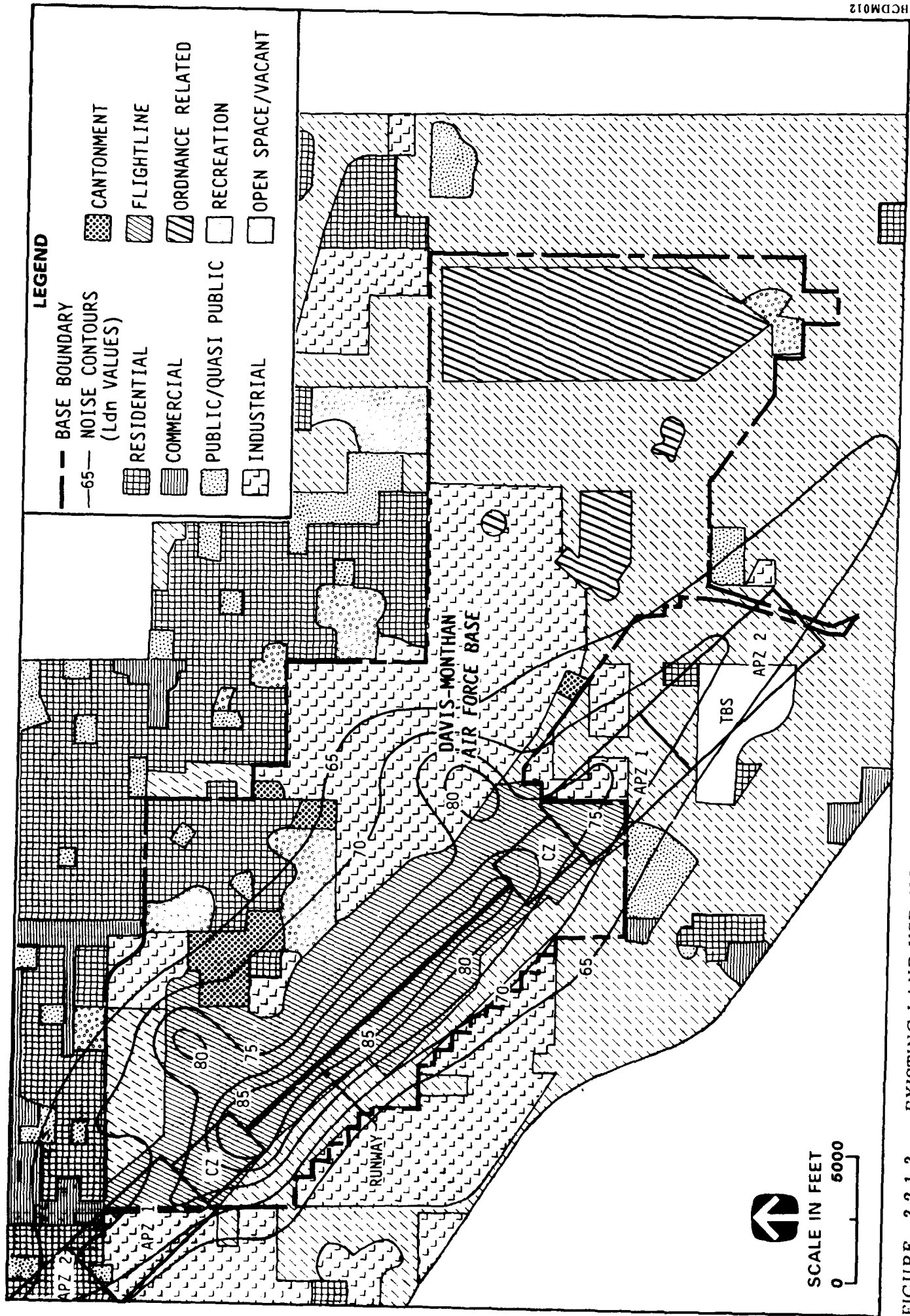


FIGURE 3.2.1-3 EXISTING LAND USE, NOISE CONTOURS, AND AIRCRAFT ACCIDENT POTENTIAL ZONES, DAVIS-MONTHAN AFB, ARIZONA AND VICINITY

compatibility within the flight operations of the base. Base planners work closely with the city and county to implement AICUZ recommendations and minimize incompatible development near the base.

Four land use plans have been adopted for the areas surrounding Davis-Monthan AFB and are used by the City of Tucson and Pima County to guide growth and development. The City of Tucson has adopted the *Arroyo Chico Area Plan* (northwest of the base), *Esmond Station Area Plan* (southeast of the base), and the *South Pantano Area Plan* (north and east of the base). Pima County has adopted the *Southeast Area Plan* (south of the base). All four plans were developed in conjunction with Davis-Monthan AFB officials and discourage incompatible development near the base. Davis-Monthan AFB planning officials are notified by the city and county to review development plans and rezoning requests.

The *Comprehensive Plan of the City of Tucson* contains a policy whereby local governments shall coordinate land use planning efforts with federal authorities to ensure that proposed developments are compatible with adjacent National Defense Facilities.

The *Pima County Airport Environs and Facilities Zoning Ordinance*, adopted in 1987, incorporates many of the recommendations of the Davis-Monthan AFB AICUZ and the Airport Environs Plan (1982). This county ordinance is one of the most restrictive in the United States; it regulates areas of high noise exposure and intensity of land uses, prohibits airport hazards, and limits heights within take-off and landing approaches. The ordinance prevents incompatible land use in county areas south of the base.

The City of Tucson adopted the *Airport Environs Zone* in April 1990. This zoning ordinance incorporates many of the AICUZ recommendations and allows the city to prevent incompatible development around the base in the future. The city zoning ordinance is similar to the Pima County ordinance in that it regulates areas of high noise exposure, limits intensity of land use, and limits heights within take-off and landing approaches. APZs are established which prohibit public assembly and uses such as day care, educational buildings, medical service and adult day care; and regulate intensity of land use. In addition, upon annexation, the areas southwest of the base that are currently outside the city limits would be regulated in accordance with the more restrictive Pima County Ordinance. This provision will ensure compatible development south of the base.

Most of the north APZ 1 and all of the north APZ 2 lie in developed areas of Tucson. These areas contain considerable uses that are incompatible with Air Force AICUZ recommendations. Most of these uses were established prior to initiation of the AICUZ program at Davis-Monthan AFB in 1975. Incompatible uses include a small residential area and industrial uses that exceed Air Force density recommendations in APZ 1; and a school and residential use at densities higher than Air Force recommendations in APZ 2. The south APZs are largely vacant. In addition, offbase residential areas at the north end of the runway lie within both the  $L_{dn}$  65 to 70 dB and the  $L_{dn}$  70 to 75 dB noise contours. The Air Force discourages residential use in areas exposed to  $L_{dn}$  65 dB or greater. The offbase residential area exposed to  $L_{dn}$  65 to 70 dB noise levels is approximately 910 acres; the area exposed to  $L_{dn}$  70 to 75 dB noise levels is approximately 70 acres.

**Aesthetics.** Tucson is typical of other urbanized areas of the Southwest in that the urban area is concentrated on the rolling flat desert floor surrounded by rugged hills and mountains which dominate the urban skyline.

The western third of Davis-Monthan AFB is generally a continuation of the offbase urban area of Tucson. Residential offbase neighborhoods abut the base boundary next to the base military housing. The offbase industrial and commercial areas abut the base boundary. Base buildings and landscaping reflect the arid Southwest setting. Older buildings are generally block (few World War II buildings

remain) and are painted in light earth tones. Newer buildings have an unpainted stone exterior that requires little maintenance. Landscaping in most of the cantonment area is desert landscaping requiring little water. Typical desert plants used are saguaro and other cactus, ocotillo, palo verde, mesquite, and fan palm. Lawns and nondesert trees and shrubs are dominant in the housing area, but conversion to low-water landscaping is encouraged.

The central part of the base is dominated by the AMARC. This large area (2,600 acres), storing over 3,000 aircraft, is unique and visually impressive, and a landmark in the Tucson area.

The eastern quarter of the base is sparsely developed in order to control a large area of open space for explosive safety zones for munitions storage, disposal, or use; a small arms range; and mission-related training exercises. The surrounding land offbase generally reflects the onbase open space, and is primarily undeveloped land owned by the State of Arizona.

### **3.2.1.3            Transportation**

**Transportation Systems.** Primary highways that pass through the Tucson metropolitan area include Interstates 10 and 19, and State Highways 83 and 86. Interstate 8 is approximately 60 miles north of the City of Tucson. Figure 3.2.1-4 shows the principal highways and roads near Davis-Monthan AFB.

Four gates provide access to Davis-Monthan AFB (Figure 3.2.1-3). The main gate is located at the intersection of Craycroft Road and Golf Links Road. A daily average of 17,000 vehicles enter and exit this gate. The main gate is the only gate open on the weekends. The Wilmot Road Gate is located at the corner of Nicaragua Drive and Wilmot Road; Swan Gate is located on Swan Road; and the AMARC Gate is located on Kolb Avenue. Traffic entering and exiting the Swan, Wilmot, and AMARC gates is lower than the main gate (5,500 ADT at Swan Gate; 7,400 ADT at Wilmot Gate; and 1,500 at AMARC Gate).

Commercial air service is available at Tucson International Airport (TIA) approximately 5 miles southwest of Davis-Monthan AFB (Figure 3.2.1-5). Fourteen commercial airlines operate an average of 120 flights per day out of this airport (Tucson Economic Development Corporation 1990). Southern Pacific Railroad provides freight service and Amtrak provides passenger service to the City of Tucson. An average of 30 freight trains per day pass through Tucson, while three passenger trains service the city per week.

**Ground Traffic.** Table 3.2.1-1 presents traffic volumes and capacities for major arterials surrounding Davis-Monthan AFB. Traffic volumes are well below capacity on all roadways, even during peak hours when the LOS is typically A. This finding is consistent with empirical observation (May 1990) of local traffic flow (i.e., traffic flow is relatively stable throughout the day on these streets, with infrequent delays). Queuing occurs at the base gates during peak hours, but this does not affect traffic flow on local roadways.

**Air Traffic.** The Davis-Monthan AFB airfield is used heavily by both based and transient aircraft. Table 3.2.1-2 summarizes airfield use for 1989 by aircraft type.

TIA generates approximately 120 aircraft operations per day. Air traffic conflicts are prevented through coordinated air traffic control between Davis-Monthan AFB and TIA. Since Davis-Monthan AFB and TIA runways are parallel and 5 miles apart, conflicts between military and civilian traffic are minimal. Within approximately 10 nautical miles of the Davis-Monthan AFB runway, the base control tower provides visual control for all air traffic below 5,700 feet MSL northeast of Interstate 10; the TIA tower provides the same control southwest of Interstate 10.

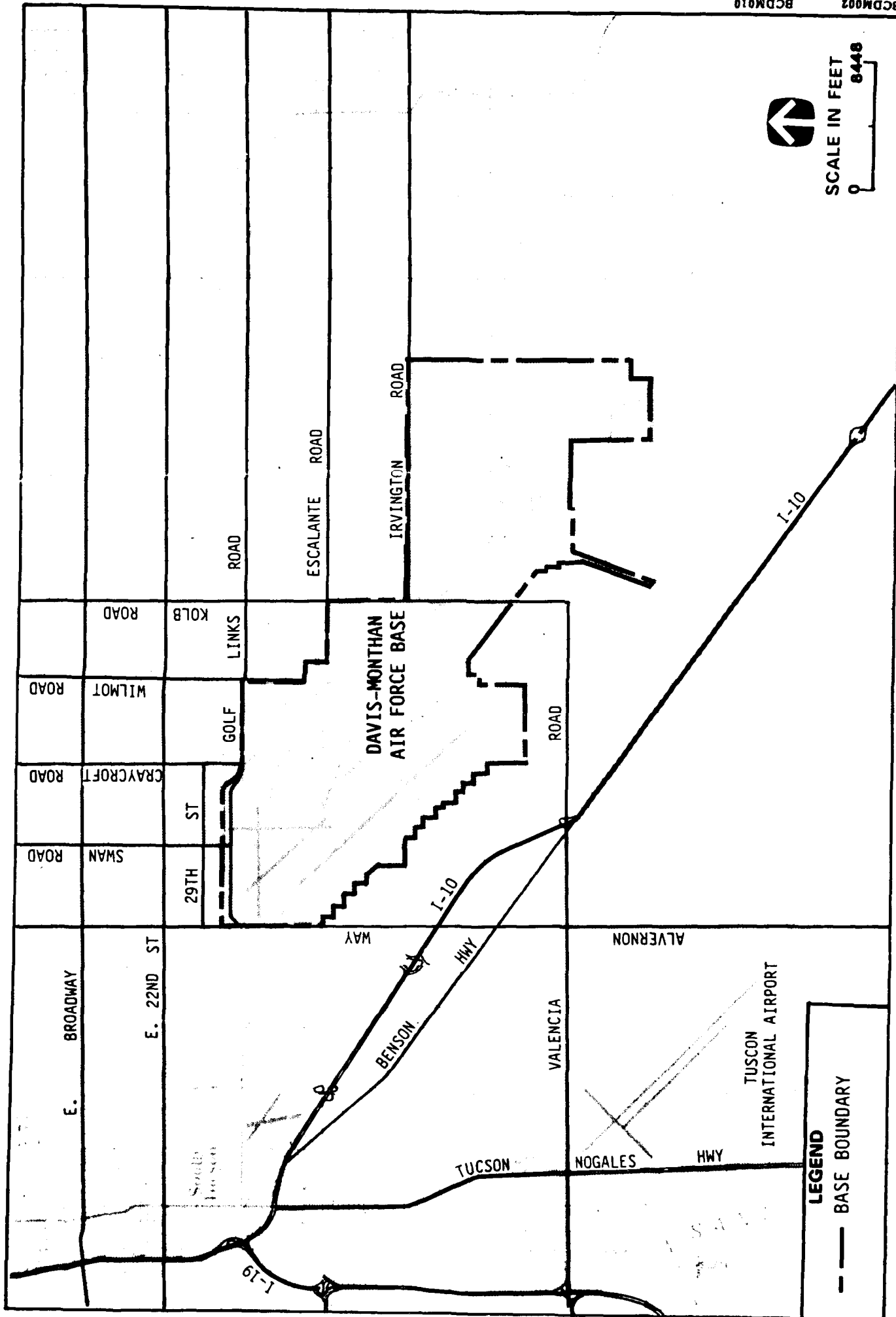


FIGURE 3.2.1-4 PRINCIPAL ROADWAYS IN THE VICINITY OF DAVIS-MONTHAN AFB, ARIZONA

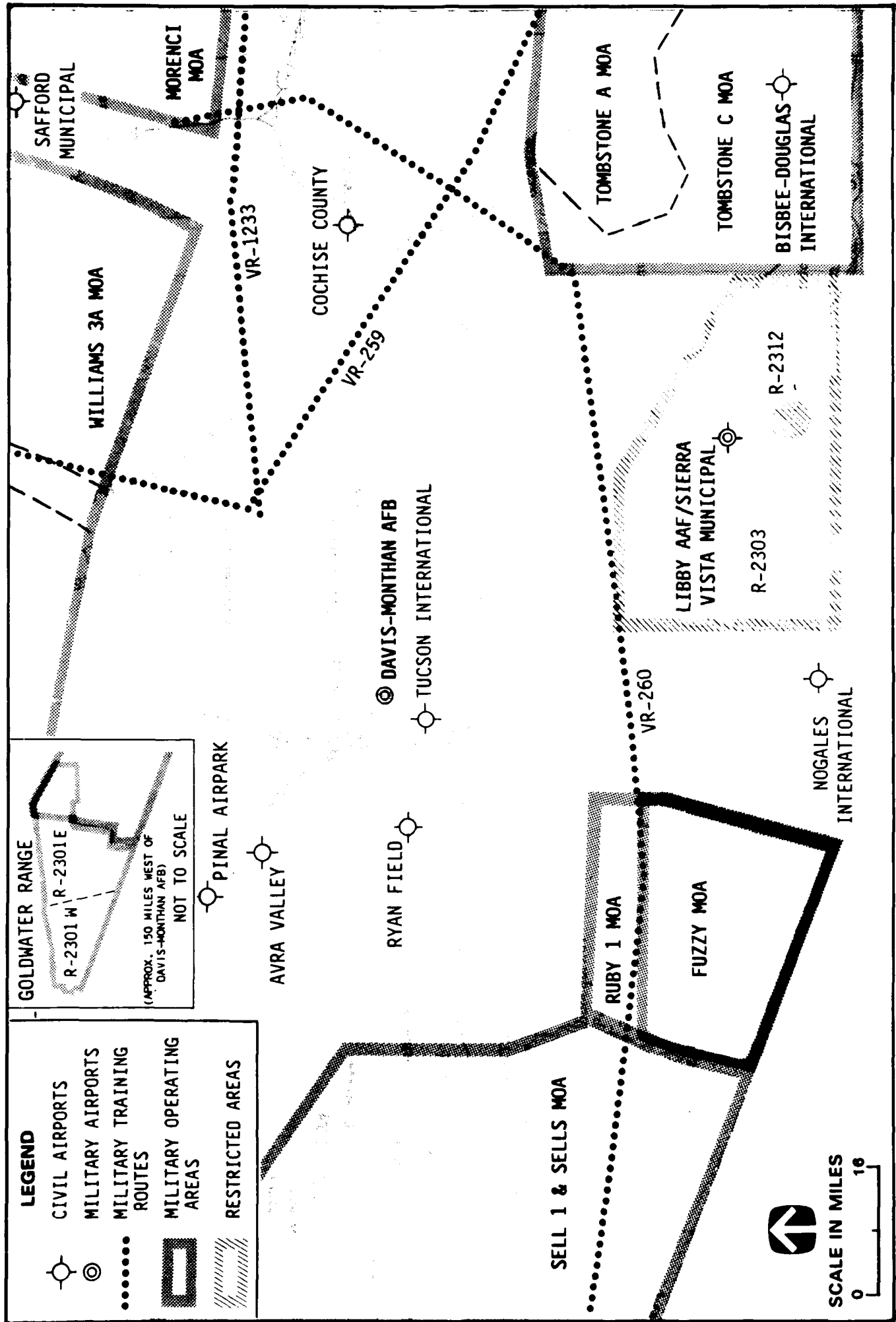


FIGURE 3.2.1-5 AIRPORTS AND AIRSPACE SURROUNDING DAVIS-MONTHAN AFB, ARIZONA

Table 3.2.1-1

Existing Traffic Conditions for  
Roadways in the Vicinity of Davis-Monthan AFB

Roadway/Intersection	Segment	1989 ADT Volume	Peak Hr. <sup>(1)</sup> Volume	Hourly Capacity <sup>(2)</sup>	Volume-to- Capacity (V/C) Ratio	LOS
Craycroft Rd.	Golf Links Rd. and 29th St.	21,000	2,100	8,000	0.26	A
Golf Links Rd./Swan Rd.	Intersection	39,700	3,970	12,000	0.33	A
Swan Rd.	22nd St. and Broadway	24,800	2,480	8,000	0.31	A
Golf Links Rd.	Wilmot Rd. and Kolb Rd.	42,200	4,220	12,000	0.35	A
22nd Street	Craycroft and Swan	43,700	4,370	12,000	0.36	A
Broadway	Craycroft and Swan	41,500	4,150	12,000	0.35	A
Kolb Rd.	22nd St. and Golf Links Rd.	35,300	3,530	12,000	0.29	A
Kolb Rd./Irvington Rd.	Intersection	23,400	2,340	12,000	0.19	A
Valencia Rd.	Kolb Rd. and Interstate 10	15,800	1,580	8,000	0.19	A

Notes: <sup>(1)</sup>Peak hour volume based on peak hour factor of 0.10 of ADT.<sup>(2)</sup>Capacity based on maximum capacity of 2,000 vehicles per hour per lane.

ADT = Average Daily Traffic

V/C Ratio = Volume-to-Capacity Ratio

LOS = Level of Service:

A = Free-flow operations: high average speeds and unimpeded maneuverability (V/C ratio  $\leq 0.40$ ).B = Reasonably free-flow operations: above average speeds and slight impacts on maneuverability (V/C ratio  $0.41 - 0.55$ ).C = Stable operations, typically meets design standards: some speed restrictions as a result of congestion and noticeably restricted freedom to maneuver (V/C ratio  $0.56 - 0.75$ ).D = Borders on unstable flow: speeds reduced by congestion and severely limited freedom to maneuver (V/C ratio  $0.76 - 0.90$ ).E = Extremely unstable flow: virtually no usable gaps in the traffic stream to maneuver from one lane to another without causing disruption to traffic flow (V/C ratio  $0.91 - 1.05$ ).F = Forced or breakdown flow: intermittent traffic stoppage in a lane and queues behind breakdown points (V/C ratio  $> 1.06$ ).

Table 3.2.1-2

## Use of Davis-Monthan AFB in 1989

Unit	Aircraft Type	No. Sorties
<u>Davis-Monthan-Based Aircraft</u>		16,594
355 TTW	A-10	6,336
602 TAIRCW	OA-10	2,592
602 TAIRCW	OV-10	1,003
41 ECS	EC-130	582
71 SOS	Helicopter	805
120 FIG	F-16A	<u>2,100</u>
U.S. Customs	Helicopter, Light Aircraft	30,012
<u>Transient Aircraft</u>		9,000 <sup>2</sup>
<b>TOTAL:</b>		39,012

Notes: <sup>1</sup>One sortie equals one aircraft arrival and departure.

<sup>2</sup>Estimate.

Source: 836th AD/ASM, Davis-Monthan AFB.

The joint FAA/U.S. Air Force Tucson radar approach control (TRACON), located at Davis-Monthan AFB, controls traffic between 5,700 feet MSL and 17,999 feet MSL out to approximately 25 nautical miles. Davis-Monthan AFB and TIA share a joint Airport Radar Service Area with mandatory procedures for control of aircraft established by letter of agreement between Tucson TRACON, Davis-Monthan AFB, and Albuquerque Air Route Traffic Control Center. Other civilian airports in the region (Figure 3.2.1-5) pose negligible potential for air traffic conflicts with Davis-Monthan AFB. Pinal Air Park, northwest of Tucson, is a very active general aviation airfield. Standard Davis-Monthan AFB instrument and visual approach and departure patterns are far enough south to avoid traffic from this airport.

Davis-Monthan AFB aircraft use a number of MOAs, primarily in southern Arizona (Figure 3.2.1-5). Tables 3.2.1-3 and 3.2.1-4 list special use airspace and military training routes used by Davis-Monthan AFB aircraft for areas scheduled by Davis-Monthan AFB, and for areas scheduled by other bases, respectively.

**Table 3.2.1-3**

**Special Use Airspace and Military Training Routes Scheduled by  
Davis-Monthan AFB**

<b>Type/Designation</b>	<b>Area</b>	<b>Altitude Block</b>
Military Operating Area (MOA) Tombstone	4,000 sq mi	500 ft AGL - 14,500 ft MSL
Air Refueling Track AR 639/639A	N/A	Above Tombstone MOA
Military Training Routes Visual Routes (VR) 259, 260, 267, 268, 269, and 1233	N/A	Low Altitude

**Table 3.2.1-4**

**Special Use Airspace Used by  
Davis-Monthan AFB, but Scheduled by Other Agencies**

<b>Airspace</b>	<b>Using Agency (Scheduler)</b>	<b>Approximate Distance from Davis-Monthan AFB</b>
Sells MOA	Luke AFB	60 miles (west)
R2301 (Goldwater Range)	Luke AFB	150 miles (west)
Ruby/Fuzzy MOA	162nd TFG (TIA)	40 miles (southwest)
Williams 3A MOA	Williams AFB	60 miles (northeast)

**3.2.1.4 Utilities**

**Water Supply.** Drinking water for Davis-Monthan AFB is obtained from groundwater by a series of nine base-operated wells. The base water is chlorinated as necessary to meet EPA drinking water standards. Average annual water usage for 1984 through 1987 was approximately 2,161 acre-feet or 704 million gallons. Because of implementation of various water conservation measures, the average annual water usage for 1988 and 1989 was approximately 1,923 acre-feet or 667 million gallons.

**Wastewater Treatment.** Wastewater generated at Davis-Monthan AFB is collected in base-maintained sanitary sewer systems. The sanitary sewer discharges are treated offbase at the Roger Road Treatment Plant. Approximately 1.1 MGD of wastewater are generated by the base and treated at the Pima County Roger Road Treatment Plant. This includes about 300,000 gallons from industrial sources and 800,000 gallons from domestic sources. This represents approximately 3.6 percent of the annual average flow (30 MGD) of wastewater treated at the Roger Road plant. The Roger Road

Treatment Plant has existing capacity to treat 31 MGD annual average daily flow and 60 MGD peak daily flow at the secondary treatment level.

**Solid Waste.** Since December 1976, nonhazardous solid wastes generated by the base have been collected from dumpsters by a private contractor who hauls the material to the City of Tucson Los Reales landfill. The Los Reales landfill accepts approximately 400,000 tons of solid waste per year and has an estimated 8- to 10-year useful life remaining at the current disposal rate. Pathological wastes are collected at the base hospital for destruction in the base pathological incinerator. Approximately 3,500 tons of nonhazardous solid wastes and 127,000 pounds of pathological wastes were generated by the base last year.

**Energy.** The Tucson Electric Power Company (TEPC) provides power to Davis-Monthan AFB. Approximately 70 million kWh of electric power were used by the base in 1989. Total power supplied by TEPC to the Tucson area in 1989 was approximately 6 billion kWh. Therefore, Davis-Monthan AFB electric consumption represents approximately 1.1 percent of the Tucson area consumption.

Natural gas supplies to Davis-Monthan AFB are provided by the Southwest Gas Corporation. During 1988, the base used approximately 200 million cubic feet (MMcf) of natural gas. This represents approximately 1.1 percent of the Tucson area consumption, which was approximately 19,000 MMcf in 1988.

### **3.2.2 Hazardous Materials/Waste Management**

#### **3.2.2.1 Hazardous Materials Management**

Hazardous materials are used and temporarily stored at the Base Supply Main Warehouse, the Base Supply Chemical Warehouse, AMARC Supply Warehouse, Building 7236, and at various industrial facilities throughout Davis-Monthan AFB which are operated to maintain, repair, and recondition a wide variety of military equipment. Common operations at the industrial facilities include paint stripping, parts cleaning, and painting. Most of the hazardous materials associated with these operations consist of solvents (e.g., trichloroethane, toluene, acetone, methanol, xylene, methylethyl ketone), paint strippers (e.g., ethanolamine), and paints. Other hazardous materials used and stored at the base include fuels (e.g., JP-4, diesel, MOGAS), oils, herbicides and pesticides, a variety of chemicals (e.g., sulfuric acid, chlorine), and munitions. Table 3.2.2-1 lists the major industrial operations at the base that use hazardous materials.

Management of hazardous material storage, use, and spill prevention and control at Davis-Monthan AFB is outlined in various plans which include the Underground Storage Tank Management Plan (June 1989), the Solvent Management Plan (November 1987), and the Spill Prevention and Response Plan (SPRP) (May 1989).

**Aboveground and Underground Storage Tanks.** Davis-Monthan AFB has 46 aboveground tanks used to store petroleum products such as diesel fuel, JP-4, heating oil, and gasoline. Sizes range from 100 gallons to 2,814,000 gallons. The largest, three 2,814,000-gallon tanks located at Building 115, store JP-4 supplied by a 6-inch pipeline maintained and operated by Southern Pacific Pipeline, Inc. Most of the bulk storage tanks (greater than 660 gallons) are surrounded by secondary containment systems equal to the volume of the storage tank with 1 foot freeboard.

Davis-Monthan AFB has 105 USTs of which 46 are regulated under Title 40 CFR 280.10 through 280.74. The nonregulated tanks are those containing heating oil for various buildings throughout the base and are therefore exempt. The regulated tanks contain a variety of petroleum products such as diesel, JP-4, gasoline, MOGAS, and oil, and range in size from 125 gallons to 50,000 gallons. Twenty-nine tanks are temporarily out of service and contain sodium hydroxide (pH 12) preserving

Table 3.2.2-1

## Industrial Operations Utilizing Hazardous Materials

Shop Name	Location (Bldg. No.)
<u>AMARC</u>	
Powered AGE Maintenance Shop	7222
Corrosion Control Shop	7425
Propulsion Shop	7300/7301/7340
NDI Lab	7401
Pneudraulics/Welding Shop	7415
Preservation Section (Flush Farm)	7448
Reclamation Shop (Parts Removal)	7401
Small Parts Cleaning Shop	7401
<u>836th Transportation Squadron</u>	
General Purpose Vehicle Maintenance Shop	4705
<u>23rd TASS/CAMS</u>	
AGE Maintenance Shop	1358
Corrosion Control	1447
<u>355th CRS</u>	
Battery Shop	5045
NDI Lab	5406
Fuel Systems Repair Shop	5256
Engine Shop	5245
Non-Powered AGE Maintenance Shop	5245
<u>355th EMS</u>	
AGE Maintenance Shop	4712
NDI Shop	5406
Armament Shop	4710
Corrosion Control Shop	5255
<u>41st ECS</u>	
AGE Shop	125
Fabrication Branch Welding Shop	110
Pneudraulics & Repair & Reclamation Shop	129
Propulsion Shop	133
Corrosion Control Shop	136

Table 3.2.2-1, Continued

Shop Name	Location (Bldg. No.)
<u>868th TMMS</u>	
AGE/Corrosion Control	71
Vehicle Maintenance	73
<u>836th CES</u>	
Protective Coating Shop	5314
Welding Shop	5314
Material Control	5320
Entomology Shop	5142
<u>Other Areas</u>	
Hospital	348/400/401/408
Gas Chlorinators	65/66/67/124
Photo Lab	1235
U.S. Customs Service	1244
Aero Club Maintenance	1749
Base Service Station	4703
Auto Hobby Shop	4531

Sources: Spill Prevention and Response Plan, Davis-Monthan AFB 1989; CH<sub>2</sub>MHill 1982.

solution. Another 11 tanks have been taken out of service permanently and will be removed. The tanks abandoned in place are either empty or filled with sand. All USTs and associated piping at Davis-Monthan AFB were upgraded to comply with the new UST regulations. Tank performance standards, operating requirements, monitoring, release reporting, investigation, confirmation, response, and corrective actions are detailed in the Underground Storage Tank Management Plan for Davis-Monthan AFB (June 1989).

**Pesticides/Herbicides.** A variety of chemicals are used at Davis-Monthan AFB to control pest infestations and ground foliage. Pesticide management activities at the base are performed by the 836th CES Entomology Shop and must meet requirements as specified in Air Force Regulation 19-21. Approximately 500 gallons of assorted insecticides and herbicides are stored in 1-gallon to 5-gallon cans at the Entomology Shop (Building 5142).

**Other Hazardous Materials.** Corrosives, acids, compressed gases, and various other hazardous materials are received and stored temporarily (up to 72 hours) at a designated area within the Base Supply Main Warehouse. Materials are checked and assigned a hazard code prior to distribution or storage at the Base Chemical Warehouse. Materials stored at the Base Chemical Warehouse and AMARC Supply Warehouse are separated into open-air subunits and temperature-regulated closed buildings that house flammables, corrosives, acids, compressed gases, POL products, and batteries.

### 3.2.2.2 Hazardous Waste Management

Davis-Monthan AFB operates as a generator of hazardous waste and a Treatment, Storage, and Disposal (TSD) facility. Approximately 2,000 pounds of hazardous waste are generated per month by activities such as spray painting, solvent degreasing, paint removal, laboratory analysis, open burning/open detonation of unserviceable munitions items, corrosion control residues, and other chemical products that have exceeded their shelf lives. A Hazardous Waste Management Plan (January 1990) has been developed and implemented to ensure compliance with RCRA requirements for the base. In addition, the base has also developed a Waste Minimization Guide (August 1989) to provide information and procedures to reduce and minimize the generation of hazardous wastes at the base. Waste minimization methods include hazardous materials control (e.g., elimination of unnecessary waste-producing operations), materials substitution (e.g., substituting the solvent Rinsolve 140 for toluene and xylene), process change, recycling, or treatment (e.g., neutralization, precipitation of metals from solution, ion exchange).

Hazardous wastes generated at various locations (except for sulfuric and hydrochloric acids, which are neutralized and discharged to the sanitary sewer) are collected in drums at an accumulation point in or adjacent to the work place prior to being shipped to the onbase DRMO storage facility at Building 7815. Storage in the accumulation point is temporary and cannot exceed 90 days from the time the waste begins to accumulate. Table 3.2.2-2 lists the ten designated accumulation points.

*Treatment, Storage, and Disposal Facilities.* Two locations treat, dispose of, or store hazardous wastes for more than 90 days, and are therefore regulated under 40 CFR 265: (1) DRMO Storage Facility, Building 7815; and (2) 836th Air Base Operability Squadron, Explosive Ordnance Disposal (ABOS EOD) Range. Figure 3.2.2-1 shows the location of these facilities on the base. An interim status permit has been obtained from the State of Arizona for both facilities. A RCRA Part B permit application and operations plan were submitted to the State of Arizona on November 8, 1988. Also shown on Figure 3.2.2-1 is Facility P-2, a temporary hazardous waste storage facility used from early January 1981 through April 1984. The facility consists of a concrete pad and asphalt apron enclosed by a 6-foot chainlink fence and surrounded by an earthen berm. Hazardous waste was stored in

Table 3.2.2-2

#### Hazardous Waste Accumulation Points on Davis-Monthan AFB

Organization	Bldg
868th TMMS Corrosion Control	78
355th EMS Trailer Maintenance	183
41st ECS AGE	221
355th EMS Corrosion Control	5260
836th CES Paint	5314
AMARC Paint	7327
AMARC Small Parts Washrack	7401
AMARC Corrosion Control	7425
AMARC Materials Lab	7615
Explosive Ordnance Disposal Range	--

Source: Hazardous Waste Management Plan, Davis-Monthan AFB, 1990.

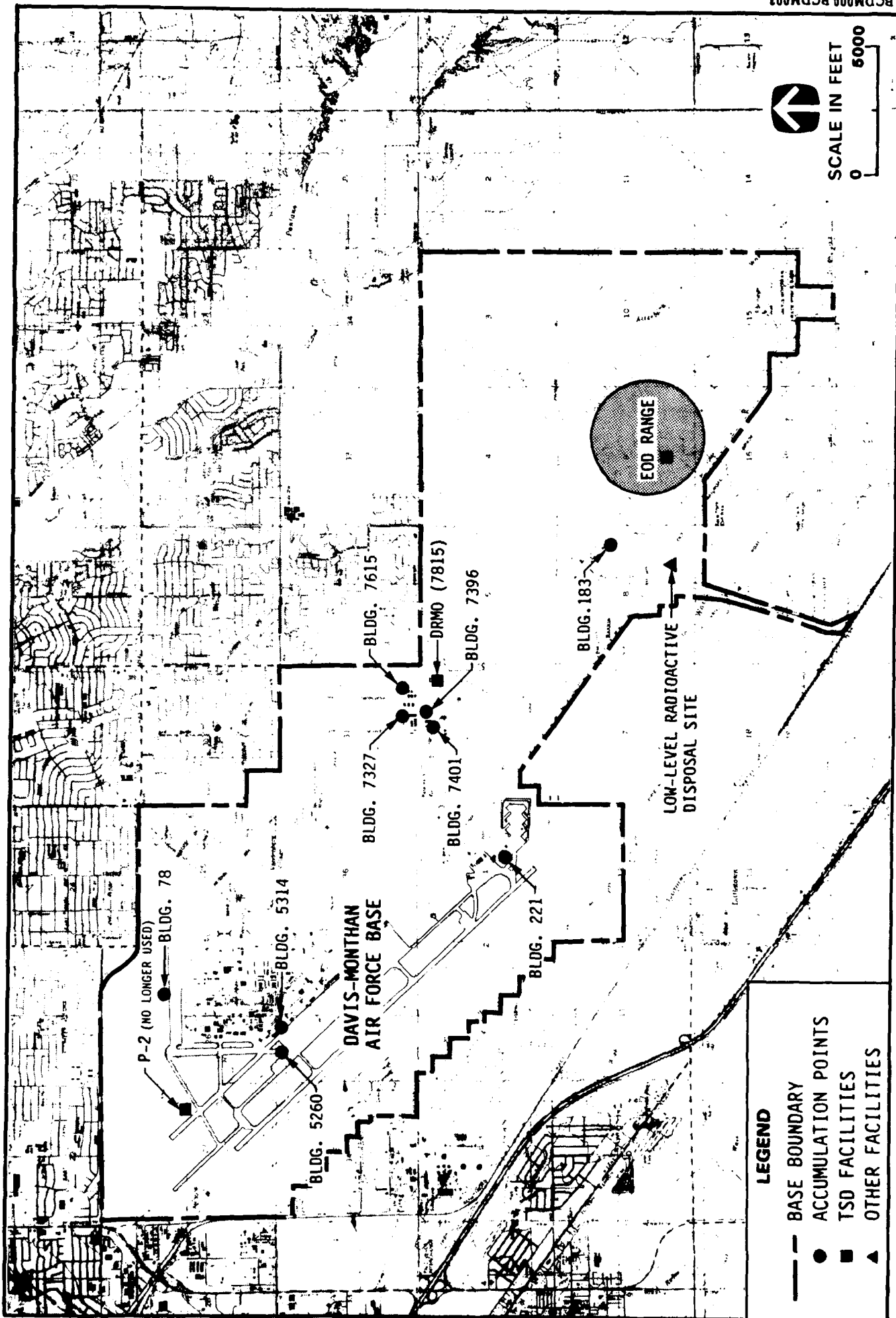


FIGURE 3.2.2-1 LOCATION OF VARIOUS HAZARDOUS WASTE ACCUMULATION POINTS AND FACILITIES, DAVIS-MONTHAN AFB, ARIZONA, 1989

containers on the asphalt apron and concrete pad and the maximum amount stored was 5,000 gallons; the present inventory is zero. A Closure Plan has been submitted to the Arizona Department of Environmental Quality to permanently close Facility P-2 in accordance with the requirements of 40 CFR 270.14 (b), 264.110-115, and 264.178.

The Davis-Monthan AFB DRMO is responsible for all hazardous wastes from DOD activities located within its jurisdiction, including Fort Huachuca, except for waste categories cited in the DEQPPM 80-5 and unserviceable munitions items which are the responsibility of the 836th ABOS EOD Range.

Unserviceable munitions items are detonated or thermally treated at the EOD range. After treatment, residue is sorted and items which can be certified safe are containerized and sent to DRMO as scrap metal.

Items that cannot be certified safe are reburned, and the ash is accumulated and processed through DRMO as an Extraction Procedure (EP) toxic hazardous waste. Hazardous waste stored at the DRMO is transported to a licensed offbase TSD facility under a service contract managed by the Defense Reutilization and Marketing (DRMS).

### **3.2.2.3 Installation Restoration Program Sites**

The IRP was implemented by the DOD to identify, report, and correct potential environmental deficiencies that could result in groundwater contamination and migration of contaminants on and around DOD installation boundaries. Phase I of the program, Problem Identification/Records Search, was conducted at Davis-Monthan AFB from April 19 through April 23, 1982. Table 3.2.2-3 lists the 15 sites that were identified as potential sources of contamination. Sites Nos. 2, 3, 4, 5, and 26 were not considered to present significant concerns. Therefore, only 10 sites were recommended for follow-on Phase II Confirmation and Quantification studies. (See Section 3.1.2.3 for additional discussion on IRP.)

The objectives of the Phase II, Stage I Confirmation and Quantification study conducted at Davis-Monthan AFB were to investigate the most likely pathways for contamination from a site and to confirm the presence or absence of contamination along those pathways. Upon confirmation of contamination, the magnitude and extent were further investigated. The results were then quantitatively evaluated. Phase II, Stage I studies were initiated in November 1983 and completed in November 1984 at Davis-Monthan AFB. The 11 sites investigated in Phase II, Stage I included the 10 sites recommended for further study in Phase I and Site No. 3 (Existing Fire Training Area), which was not recommended for further study in Phase I but was reinstated for Phase II study after a Phase II Presurvey conducted in 1983. Figure 3.2.2-2 shows the locations of the 11 sites investigated in Phase II, Stage I studies.

A Remedial Investigation (RI) was initiated in 1988 by the U.S. Army Corps of Engineers (COE), Omaha District, to confirm and further assess the IRP sites evaluated in the previous Phase I and Phase II investigations, as well as several additional sites (Sites 2, 5, 26, and 29 to 41) identified by the COE subsequent to the previous IRP investigation. The objectives of the RI included the evaluation of the extent of contamination, an analysis of the fate and transport of contaminants, and the development of a baseline risk assessment to evaluate the need for any further action at each specific site. The field investigations were conducted from January through June 1988 and included geophysical surveys, soil gas surveys, soil sampling, and monitoring well installation and sampling. Figure 3.2.2-3 shows the location of the RI sites; these sites are briefly described in the following paragraphs.

**Site 1 - Main Base Landfill.** This area was the main sanitary landfill for the base from the early 1940s until 1976. The site was originally a gravel borrow pit, approximately 35 feet deep. The landfill

Table 3.2.2-3

**Phase I Priority Ranking of Potential  
Contamination Sources**

<b>Rank</b>	<b>Site No.</b>	<b>Site Description</b>
1	1	Main Base Landfill
2	18	MASDC* Flush Farm Drainage Ditch
3	25	MASDC* Tow Road
4	7	Old Electrical Substation Site
5	19	Runway No. 4 Drainage Ditch
6	21	Storm Drain Outfall Location No. 2
7	20	Storm Drain Outfall Location No. 1
8	10	Chemical Sludge Burial Site
9	17	MASDC*/Ammo Area Drainage Ditch
10	3	Existing Fire Department Training Area
11	8	Transformer Oil Spill Site
12	4	North Ramp Fire Department Training Area
13	5	Abandoned Fire Department Training Area
14	26	Fuel Tank Sludge Burial Site
15	2	MASDC* Landfill

Notes: \* Currently called AMARC.

Source: CH<sub>2</sub>M Hill 1982.

operations consisted mainly of trenches excavated at the bottom of the pit with daily cover. The site received all refuse from the base, including household garbage, scrap lumber and metal, construction debris, empty containers, paper, and old tires. The site was also reportedly used for disposal of some hazardous materials, including paint residues and thinners, and solvents in drums at the rate of about 10 drums per month.

*Site 2 - Old Landfill Area.* This area was used mainly for base housing refuse and was in use from the 1940s to 1955. Small quantities of waste thinners and solvents may also have been disposed of at this site.

*Site 3 - Existing Fire Training Area.* This training area has been used since 1968. From 1972 until recently when the new facility was built, the Fire Department training exercises were conducted once a month using about 200 gallons of JP-4 (jet fuel) per exercise. Prior to 1972, the exercises were conducted once a week using contaminated fuels.

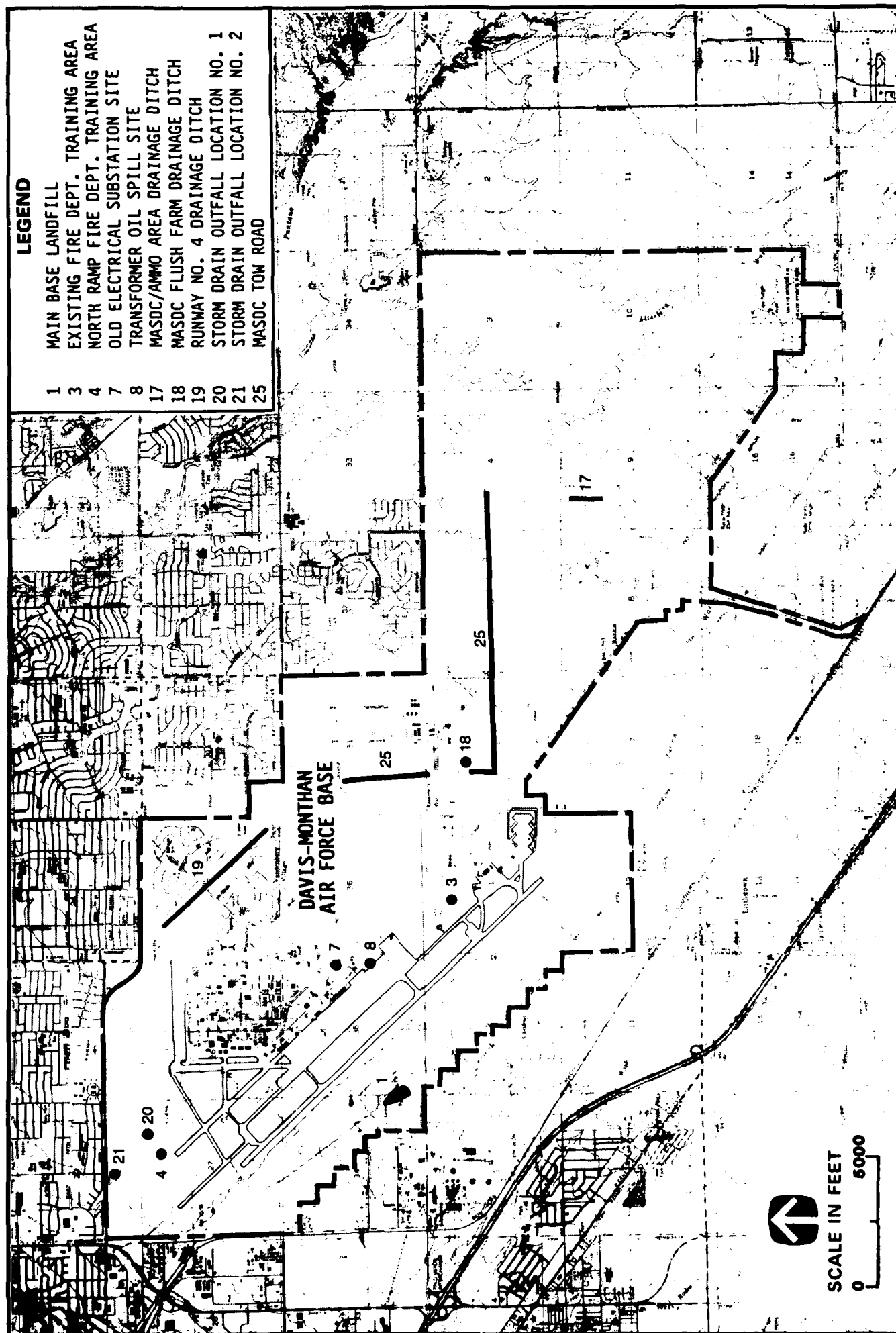


FIGURE 3.2.2-2 INSTALLATION RESTORATION PROGRAM (IRP) SITES PHASE II, STAGE I,  
DAVIS-MONTHAN AFB, ARIZONA

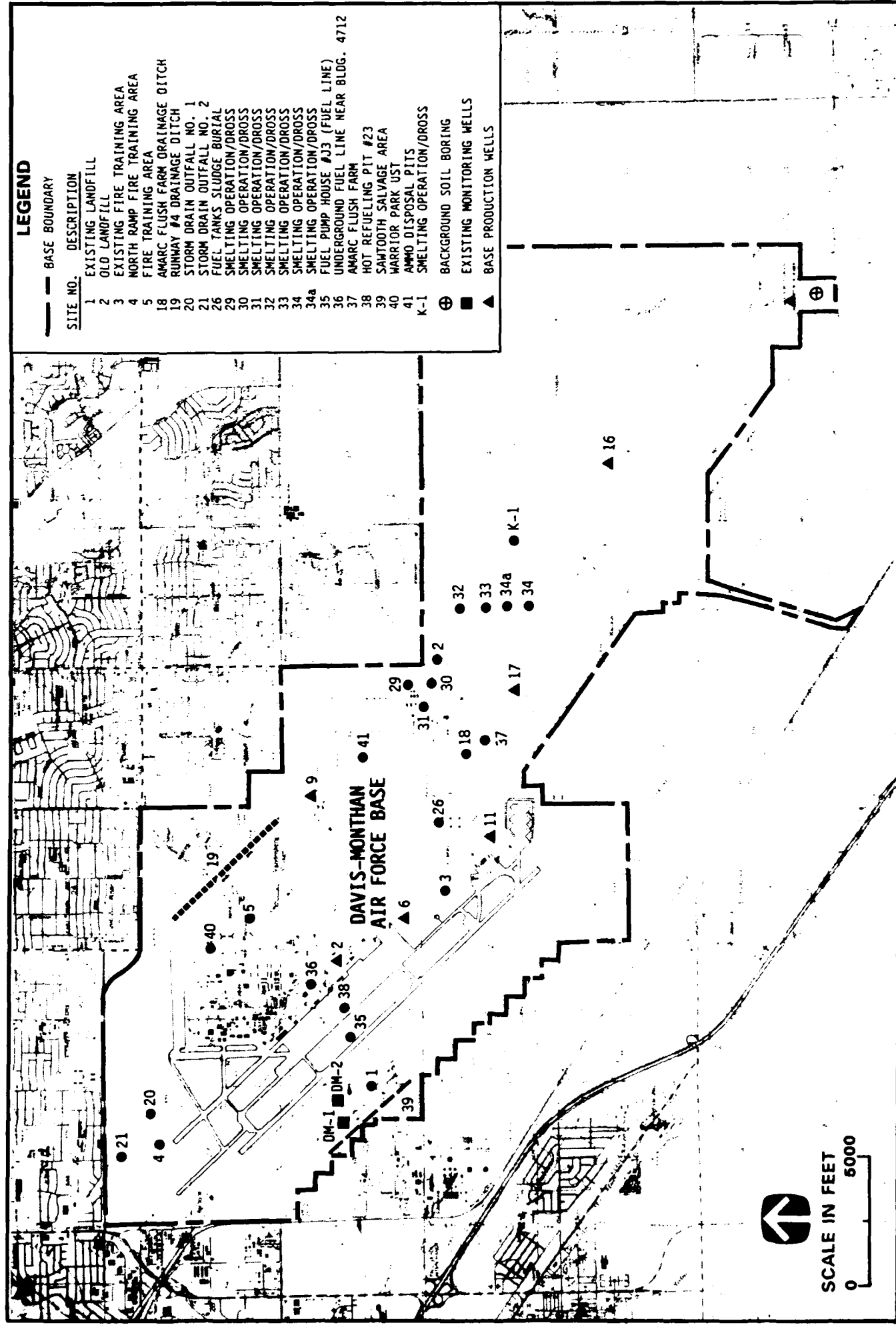


FIGURE 3.2.2-3 REMEDIAL INVESTIGATION SITE LOCATIONS DAVIS-MONTHAN AFB, ARIZONA

**Site 4 - North Ramp Fire Training Area.** This former fire training area was in use from approximately 1950 until 1968. Exercises were conducted about once a week using 200 gallons of waste POL, mainly waste fuels, per exercise.

**Site 5 - Fire Training Area.** This former fire training area was the original fire training area used during the 1940s. Frequency of exercises and quantities of waste POL were similar to those at Site 4.

**Site 18 -** See Site 37.

**Site 19 - Runway 4 Drainage Ditch.** This drainage ditch is between the abandoned Runway 4 and the Wherry onbase housing area. During the 1950s, it was common practice to drain waste oils, residual fuels, and probably waste solvents into the ditch prior to aircraft storage.

**Sites 20 and 21 - Storm Drain Outfalls 1 and 2.** These discharge points receive storm drainage from the main base industrial shop areas. The outfall discharge points would be likely locations for the accumulation of waste solvents, oils, and chemicals which may have been discharged into drainage ditches in the past.

**Site 26 - Fuel Tank Sludge Burial Site.** Weathered sludge from periodic fuel tank cleaning operations was disposed of in the past at this site. The sludge, consisting mainly of water with some rust, dirt, and fuel, was drained periodically (about once every 8 years) from the bottom of the fuel storage tanks at the rate of about 200 gallons of sludge per tank-cleaning operation. The sludge was then weathered for 2 to 4 weeks and then buried in shallow trenches. The majority of the residual fuel and volatile components would likely have evaporated into the atmosphere during the weathering operation. Because aviation fuel has been stored in these tanks in the past, some lead residue may have been present in the sludge.

**Sites 29 through 34a and K-1 - Dross Trenches.** These sites are the past locations of aluminum resmelting furnaces in the AMARC area where aluminum was recovered from retired aircraft. Some aluminum and other metallic residue from past operations may have been buried at these sites.

**Site 35 - Fuel Pump House #J3.** This site is the location of a past leak of JP-4 from a 6-inch pipeline which is buried approximately 5 feet below ground level. The leak was probably due to pipe corrosion and was repaired in June 1985.

**Site 36 - Underground Fuel Line Near Building 4712.** This site is a past gasoline leak from an underground fuel line between an underground storage tank and a dispenser. The fuel tank and line have been taken out of service.

**Site 37/18 - AMARC Flush Farm and Ditch.** Site 37 is a past leak from a hydrant at a defueling pad. Other hydrant leaks may have potentially occurred along the defueling pad. Site 18 is a drainage ditch that has received the effluent of a oil and water separator.

**Site 38 - Hot Refueling Pit #23.** This site is a past leak of JP-4 from a joint weld on an elbow beneath the hydrant at about 2 feet below the ground surface. The elbow is 4 inches in diameter. The leak was repaired in April 1985.

**Site 39 - Sawtooth Salvage Area.** This site contained 47 drums (55 gallon) of substances identified by Radian Corporation in September 1987. These substances included halogenated or nonhalogenated "F-Group" solvents, ignitable wastes, and petroleum hydrocarbons. The drums were removed immediately and disposed of properly at an offbase TSD facility. The site also contains large dross (aluminum and steel residue from aluminum remelting furnaces) piles and other identified industrial debris.

**Site 40 - Warrior Park Underground Storage Tanks.** This site is the location of two USTs that contained petroleum distillates. A leak occurred in a line between at least one of the tanks and a fuel pump in 1985. The system has been taken out of service and backfilled with sand.

**Site 41 - AMARC Burn Pits.** Unspent shells were buried at this site. During 1987, the covering material was washed away and the ammunition washed downstream. The COE conducted a geophysical survey over the site to determine the extent of buried debris.

Of the 25 sites evaluated (some of which include multiple contaminated areas), the RI Report (April 1990) recommended additional RIs for 4 sites, remedial action for 7 sites, a feasibility study for 1 site, and no further action for 12 sites. For one other site (Site 41 AMARC Ammo Disposal Pit), it was recommended that additional explorations be referred to base EOD personnel. At Site 18, a system for remediation of oil-contaminated soil is currently under construction. The findings and recommendations, currently being reviewed and evaluated by the Air Force, for each of the sites are summarized in Table 3.2.2-4.

#### **3.2.2.4 Asbestos**

An asbestos survey of representative Davis-Monthan AFB facilities was completed in 1988. Approximately 200 facilities (out of 350), 1,200 military family housing units (out of 1,255), and one General Officer's Quarters were identified as having asbestos-containing materials. However, the asbestos was not friable and no abatement was required. A base Asbestos Plan has been completed. According to Air Force policy, decisions to remove damaged friable asbestos are based on the degree of risk to facility occupants, use of the facility, and cost effectiveness. Asbestos-containing materials are also to be removed or encapsulated when the opportunity exists during minor construction repairs. Asbestos-containing materials that are not damaged or subject to potential disturbance and therefore do not pose a potential health threat are left in place.

#### **3.2.2.5 Polychlorinated Biphenyls**

Davis-Monthan AFB has tested all transformers onbase for PCBs. A sampling and analysis program conducted by the base shows that there are 928 non-PCB transformers and 39 PCB-contaminated (containing 50 to 499 parts per million [ppm] of PCBs) transformers onbase. All PCB-contaminated transformers are scheduled to be removed from service and processed through DRMO for disposal by October 1991. The DRMO is responsible for initiating the procedures to effect disposal of PCB or PCB-contaminated transformers according to the Toxic Substances Control Act (TSCA). The Davis-Monthan AFB SPRP (May 1989) outlines the PCB spill-response procedures.

Under the authority of the TSCA, Section 8(e), PCB spills have to be reported if they pose a threat or substantial risks to human health or the environment. The reportable quantity for PCBs is 10 pounds under CERCLA for release into all environmental media (land, air, or water).

#### **3.2.2.6 Radon**

Davis-Monthan AFB conducted a 3-month survey for radon during December 1987 through February 1988 at 33 randomly selected housing units. Although there are currently no established health standards for radon in residential housing, the EPA recommends mitigation actions be taken when the average annual radon concentration in the building exceeds 4 pCi/l of air. All survey sampling results indicated readings well below this level.

**Table 3.2.2-4****Summary of Recommendations, Davis-Monthan AFB IRP  
Remedial Investigation Sites**

<b>Site Number and Name</b>	<b>Recommendations</b>
Base Production Wells	Continued monitoring by base Bioenvironmental Engineering personnel.
1. Main Base Landfill	Quarterly monitoring of all wells proximal to site for water quality for the first year, and annual monitoring afterwards.
2. Old Landfill	MW-1 and MW-2 monitored quarterly for water quality for the first year, and annual monitoring afterwards.
3. Fire Training Area	Monitor MW-3 quarterly for groundwater elevation, quarterly for the first year, and annually thereafter for groundwater quality. Monitor only during the remediation. Proceed with design for remediation. Proceed with design for remediation of 2 rings (borings SB 3-7 and SB 3-8) and surface drainage area around Martin Marietta Borehole #2. Additional site characterization may be required as part of the design.
4. North Ramp Fire Training Area	No further action.
5. Former Fire Training Area	
18. See Site 37.	No further action.
19. Runway #4 Drainage Ditch	No further action.
20. Storm Drain Outfall No. 1	Additional remedial investigation to evaluate the extent and source of contamination at SB 19-5.
21. Storm Drain Outfall No. 2	No further action.
26. Fuel Tank Sludge Burial Area	No further action.

Table 3.2.2-4, Continued

Site Number and Name	Recommendations
29. 30., 31., 32., 33., 34., 34A and K-1, Dross Trenches	Cover with soil and seed, or include in a basewide dross remediation program. Determine extractable cadmium and lead in the dross. Sample on-base wash sediments for metals.
35. Fuel Pumphouse #J3	Additional remedial investigations will be conducted.
36. Underground Fuel Line	Additional remedial investigations will be conducted.
37./18. AMARC Flush Farm/Drainage Ditch	No further action.
38. Hot Refueling Pit No.23	No further action.
39. Sawtooth Salvage Are	Proceed with feasibility study for dross piles. Conduct air monitoring of dross piles. Conduct waste characterization of dross material as part of future feasibility study. Sample onbase wash sediments for metals. Enclose site with secure fence.
40. Warrior Park	Additional site investigations to confirm locations of tanks and to evaluate the extent of soil contamination.
41. AMARC Ammo Disposal Pits	No action under IRP. EOD personnel to complete further evaluation.

Source: J.M. Montgomery Engineers 1990.

### 3.2.2.7 Radioactive Waste

The records search conducted for Phase I of the IRP revealed a past disposal site onbase (Figure 3.2.2-1) for low-level radioactive waste including electron and x-ray tubes and possibly radium dials and low-level radioactive waste from the base hospital. The material was placed in four cased augured holes. The encasement eliminates any pathways for migration of radioactive material. The 20- by 23-foot concrete site is currently fenced off and marked.

### **3.2.2.8      Ordnance**

A variety of types of weapons and munitions are stored at the base's magazine area. The total net explosive weight of the ordnance stored in the magazine range from 200,000 to 1 million pounds net explosive weight. With the exception of 30-millimeter ammunition for the A-10, ordnance is carried infrequently on military aircraft operating into and out of the base. Ordnance is received at the EOD range from the Arizona Air National Guard; the U.S. Customs Service; U.S. Bureau of Alcohol, Tobacco and Firearms; and the Hughes Aircraft Company (government-owned ordnance), for disposal on the range. Approximately 1,900 pounds of explosives were disposed of at the base EOD range in 1989. Explosives to be destroyed are stored at the Ordnance Storage Area, northwest of the range, or at the AMARC, but are not stored at the EOD area or range, except on the day of the disposal operation.

### **3.2.3      Natural Environment**

#### **3.2.3.1      Geology and Soils**

**Geology.** Davis-Monthan AFB is in the eastern portion of the Tucson Basin, a 1,000-square-mile broad desert valley. The Tucson Basin is a structural basin filled with alluvium eroded from the surrounding mountains, and deposited by ephemeral streams and wind. In general, the deposits consist mainly of Quaternary (Pleistocene and Holocene, less than 10 million years old) unconsolidated and semiconsolidated sediments with grain sizes ranging from clay to boulders of granite, granite-gneiss, schist, andesite, basalt, and limestone.

In ascending order, geologic units occurring under Davis-Monthan AFB include the Pantano Formation; the lower, middle, and upper Tinja Beds; and the Fort Lowell Formation. The Pantano Formation was deposited between 38 and 26 million years ago. The Tinja Beds are partially mantled by unconsolidated sediments of the Fort Lowell Formation and recent stream terrace alluvium. The Pantano Formation and lower, middle, and lower-upper Tinja Beds were deposited 26 to 5.3 million years ago during times of basin subsidence. The upper-upper Tinja Beds and overlying strata formed as the Tucson Basin began to fill more rapidly than it subsided and a through-flowing drainage developed. Faults within the Tucson Basin have not been active in historic time.

**Soils.** The most significant soil associations occurring at Davis-Monthan AFB consist of deep (approximately 60 inches), well-drained soils on valley plains and stream terraces. These soils are formed in recent alluvium derived from a wide mixture of rock type, including andesite, basalt, schist, rhyolite, and granite-gneiss. Most of the base is covered with gravelly, and/or sandy loam to a depth of approximately 3 feet. The topsoil layer is low in fertility and subject to wind and water erosion. The loam is underlain by a calcareous loam to a depth of approximately 4 feet. Permeabilities of the soils to a depth of 60 inches are low to moderate, ranging from  $3 \times 10^{-4}$  to  $3 \times 10^{-3}$  feet/min.

#### **3.2.3.2      Water Resources**

**Groundwater.** The Tucson metropolitan area, including Davis-Monthan AFB, is dependent on groundwater sources for domestic water. Groundwater in the Tucson Basin occurs within the unconsolidated alluvial deposits consisting of inter-fingering sand, gravel, silt, and clay. The saturated thickness of these sediments is extremely variable, being less than 200 feet toward the mountains and greater than 5,000 feet toward the center of the basin. Figure 3.2.3-1 shows the

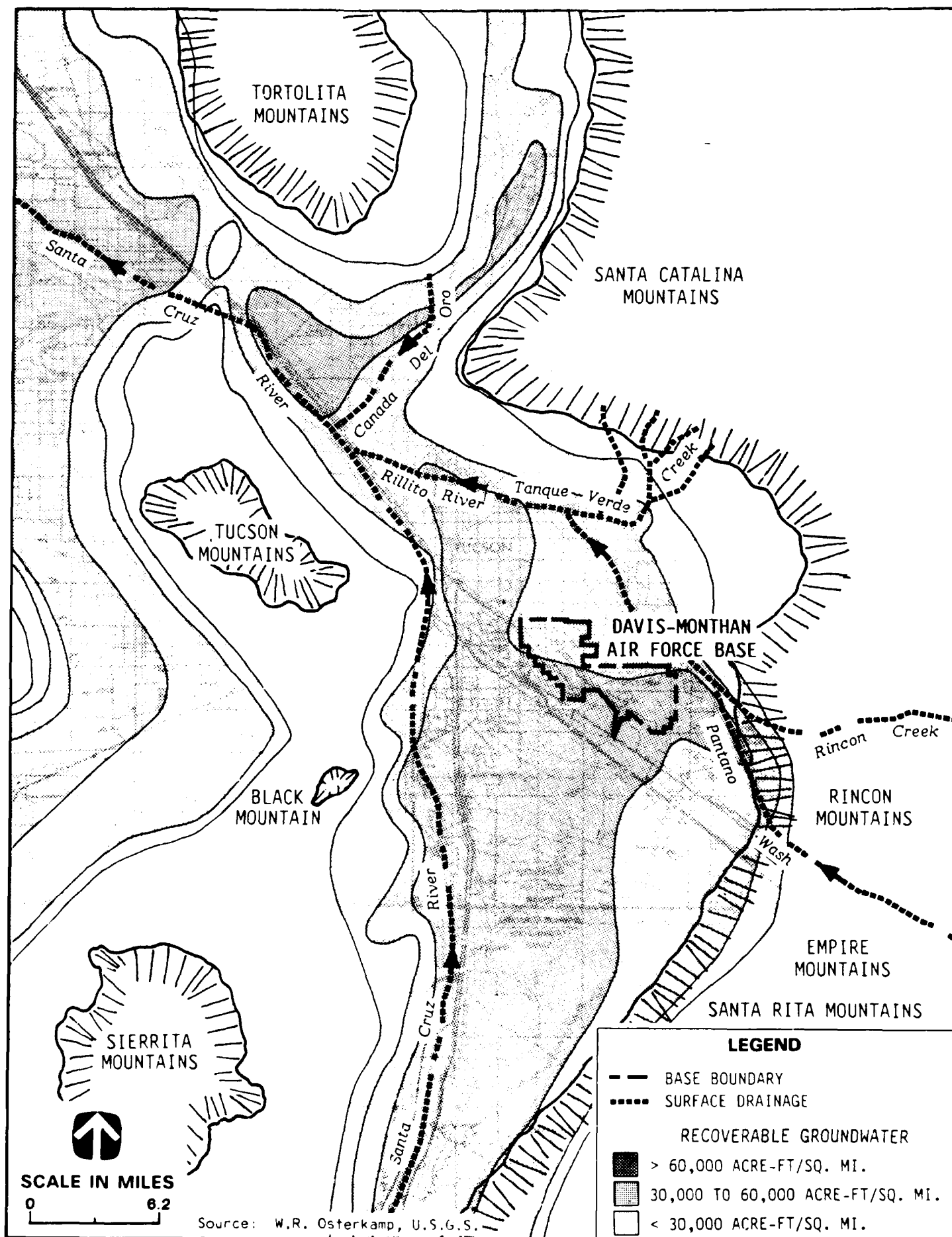


FIGURE 3.2.3-1 DISTRIBUTION OF RECOVERABLE GROUND WATER AND MAJOR SURFACE DRAINAGES, TUCSON REGION

distribution of recoverable groundwater in the vicinity of the base. Groundwater is recharged at the basin periphery and by streambed infiltration along the Santa Cruz River and its tributaries. However, because groundwater withdrawal by pumpage has exceeded groundwater recharge, the water table dropped more than 100 feet between 1953 and 1982 in the vicinity of groundwater production wells in the Tucson Basin. In the vicinity of Davis-Monthan AFB production wells, water table levels have dropped approximately 40 to 60 feet, and are currently 250 to 300 feet below the surface. Groundwater quality in the Tucson Basin is good overall, though locally elevated levels of total dissolved solids (TDS) are present in excess of EPA National Interim Drinking Water Regulations, Secondary Standards.

The aquifer beneath Davis-Monthan AFB consists of the Pantano Formation, the Tinja Beds, the Fort Lowell Formation, and in places the surficial deposits underlying the floodplains and channels of the major streams. The units forming this aquifer are loosely consolidated to strongly cemented and have a combined thickness of more than 5,000 feet. The various formations comprising this aquifer generally act as a single unconfined hydrologic unit. Locally, however, due to the occurrence of discontinuous strata of low permeability, the aquifer may act as a leaky artesian rather than an unconfined aquifer.

Within the boundaries of Davis-Monthan AFB, there are nine active production wells (Figure 3.2.3-2) ranging in depth from 405 feet to just over 1,000 feet. Most of the base wells withdraw water from the Tinja Beds, with some contribution from the Fort Lowell Formation. Historically, groundwater quality beneath Davis-Monthan AFB has met EPA National Interim Drinking Water Regulations, Secondary Standards. Recent water quality data from base production wells suggest that TDS concentrations in the groundwater range from 149 to 345 milligrams per liter dissolved solids. Hardness of the groundwater is classed as moderate to high.

**Surface Water.** The Tucson Basin is drained by the Santa Cruz River, which flows through the basin in a northwesterly direction (Figure 3.2.3-1). In the vicinity of the base the river flows almost due north and is approximately 2 miles to the west. Major tributaries of the Santa Cruz River in the Davis-Monthan AFB area include the Rillito River, which flows west into the Santa Cruz River, approximately 4.5 miles north of the base; Julian Wash, which flows northwest into the Santa Cruz River, approximately 1 mile southwest of the base; and Pantano Wash, which flows northwest into Rillito River, approximately 0.5 mile northeast of the base. The small amount and irregularity of rainfall in the Arizona desert results in erratic natural flows in the Santa Cruz River and its tributaries. These drainageways, like many in the Desert Southwest area, are dry most of the year and flow only during and immediately following storms.

Figure 3.2.3-2 shows the topography and surface drainage of Davis-Monthan AFB. The surface drainage on the base has been modified by a series of ditches which ultimately discharge directly or indirectly into the Santa Cruz River. Runoff from the northwest half of the base generally flows through ditches, leaving the base at the northwest corner and discharging to the Santa Cruz River. Runoff from the east portions of the base are captured by a network of drainage channels and discharge to a small retention pond offbase approximately 1 mile from the base boundary. Overflow from this retention pond discharges to Pantano Wash.

Stormwater discharge is collected in drainage swales and two main concrete ditches, which flow offbase. Because of pollution abatement measures at Davis-Monthan AFB, such as a recycling and collection program for various solvents, fuels, oils, and photographic wastes, and the use of oil/water separators, potential stormwater system pollutant concentrations are low. State and federal regulatory

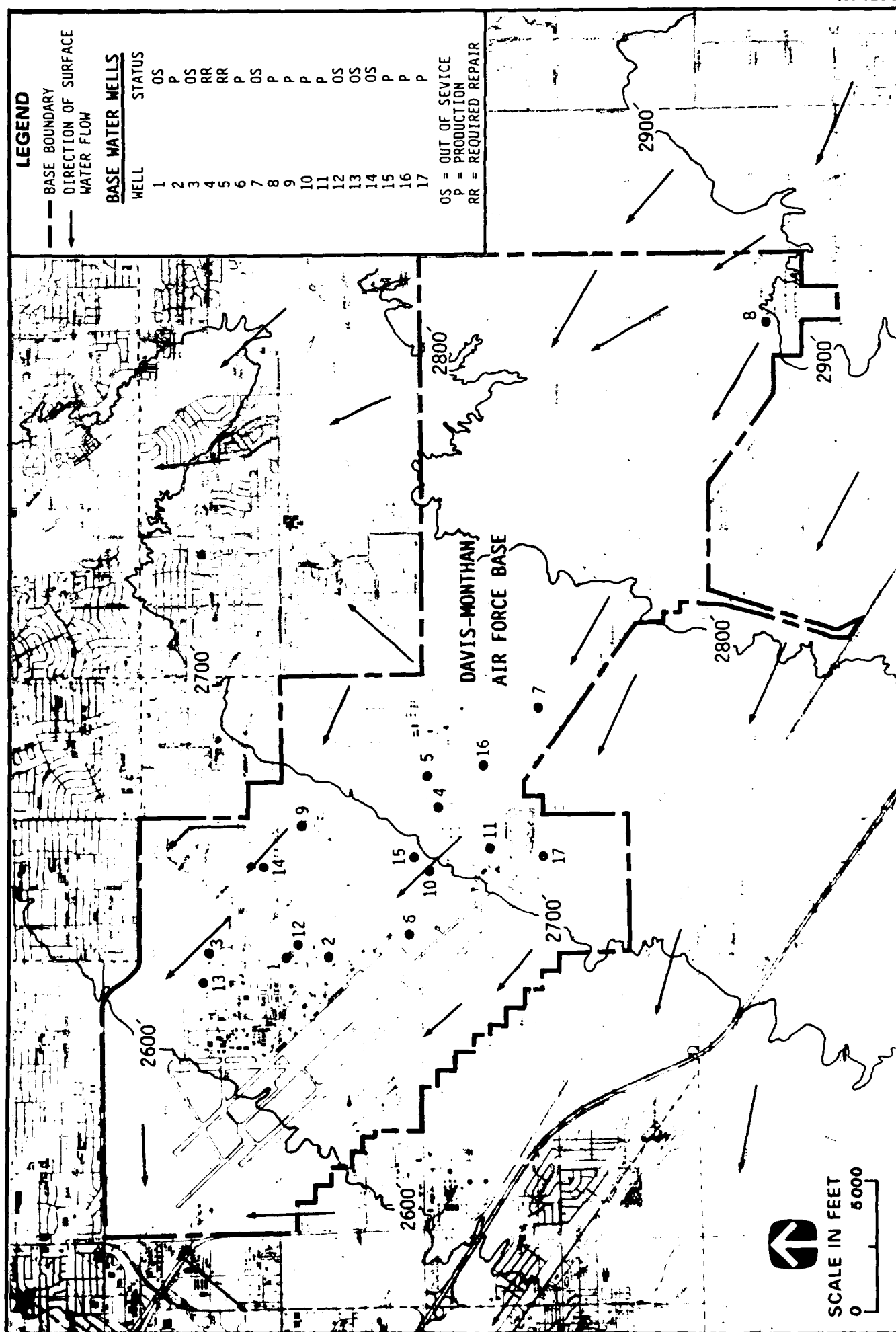


FIGURE 3.2.3-2 WATER WELLS AND SURFACE DRAINAGE, DAVIS-MONTHAN AFB, ARIZONA AND VICINITY

agencies have determined that NPDES permits are not currently necessary for these stormwater outfalls and periodic analysis is not required.

### 3.2.3.3 Air Quality

Federal and Arizona state AAQS have been established for ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter less than 10 microns in size (PM<sub>10</sub>), and lead (Pb). Arizona and federal standards are the same and are presented in Table 3.2.3-1. If ambient pollutant concentrations in an area are above the corresponding standards, the area is designated as being nonattainment for a particular pollutant. Thus an area can be attainment for some pollutants and nonattainment for others.

**Table 3.2.3-1**  
**National and Arizona State Ambient Air Quality Standards<sup>(1)</sup>**

Pollutant	Averaging Time	Primary <sup>(2)</sup>	Secondary <sup>(3)</sup>
Ozone	1 hour	0.12 ppm (235µg/m <sup>3</sup> )	0.12 ppm (235µg/m <sup>3</sup> )
Carbon Monoxide	8 hour	9ppm (10mg/m <sup>3</sup> )	
	1 hour	35ppm (40mg/m <sup>3</sup> )	
Nitrogen Dioxide	Annual Average	0.053ppm (100µg/m <sup>3</sup> )	.053ppm (100µg/m <sup>3</sup> )
Sulfur Dioxide	Annual Average	80µg/m <sup>3</sup> (0.03ppm)	
	24 hour	365µg/m <sup>3</sup> (0.14ppm)	
	3 hour		1300µg/m <sup>3</sup> (0.5ppm)
Suspended Particulate Matter (PM <sub>10</sub> )	24 hour	150µg/m <sup>3</sup>	150µg/m <sup>3</sup>
	Annual Arithmetic Mean	50µg/m <sup>3</sup>	50µg/m <sup>3</sup>
Lead	Quarterly Arithmetic Mean	1.5µg/m <sup>3</sup>	1.5µg/m <sup>3</sup>

Notes: <sup>(1)</sup>National and Arizona standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

<sup>(2)</sup>Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

<sup>(3)</sup>Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Source: Code of Federal Regulations, Title 40, Part 50, 1989.

**Existing Regional Air Quality.** Davis-Monthan AFB is located in the Pima Intrastate Air Quality Control Region. The base and the Tucson urban area are classified as attainment for SO<sub>2</sub>, NO<sub>2</sub>, and O<sub>3</sub>, and are classified nonattainment for CO and TSP. As yet, the status of PM<sub>10</sub> in the Tucson area has not been established. A minimum of 3 years of PM<sub>10</sub> monitoring will be required before a classification can be determined.

The air quality in the vicinity of Davis-Monthan AFB is depicted by the ambient pollutant concentrations measured at representative nearby monitoring stations. Air quality measurements are not made on the base. The air monitoring station at 22nd and Craycroft is about 1 mile north of the base. O<sub>3</sub>, CO, NO<sub>2</sub>, and SO<sub>2</sub> are continually monitored at this station. The nearest station monitoring particulates is in south Tucson, about 4 miles west-northwest of the base. The maximum pollutant concentrations recorded at these stations during 1986, 1987, and 1988 are shown in Table 3.2.3-2. The measured concentrations indicate that the air quality is relatively good in the vicinity of the base. Except for particulates, all of the recorded maximum concentrations are well below the ambient standard concentrations.

**Air Pollutant Emissions.** A summary of pollutant emissions from Davis-Monthan AFB stationary and mobile sources is presented in Table 3.2.3-3. As shown in the table, pollutant emissions from aircraft flying operations are the major source of base emissions. This emission category produces about 47 percent of the particulate emissions, 77 percent of the SO<sub>x</sub> emissions, 56 percent of the NO<sub>x</sub> emissions, 77 percent of the HC emissions, and 88 percent of the CO emissions. The latest regional air quality emissions inventory for Pima County extracted from the EPA National Emission Data System is provided in Table 3.2.3-4. Emissions data were available for particulates, SO<sub>x</sub>, NO<sub>x</sub>, CO, and HC.

**Table 3.2.3-2**

**Maximum Pollutant Concentrations Monitored  
Near Davis-Monthan AFB**

Pollutant	Averaging Time	Max. Concentration		
		1986	1987	1988
Ozone (ppm)	1 hour	0.078	0.092	0.093
Carbon Monoxide (ppm)	1 hour	7.9	9.0	11.1
	8 hour	3.8	3.8	5.4
Nitrogen Dioxide (ppm)	Annual	0.019	0.019	0.017
Sulfur Dioxide (ppm)	Annual	0.004	0.003	0.002
	24 hour	0.016	0.013	0.031
	3 hour	0.031	0.061	0.037
Total Suspended Particulates (µg/m <sup>3</sup> )	Annual Geometric Mean	95	83	81

Source: Pima County Annual Air Quality Data Summary 1989.

**Table 3.2.3-3**

**Davis-Monthan AFB Air Pollutant Emissions 1988 (Tons/Year)**

<b>Emission Source</b>	<b>Particulates</b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>HC</b>	<b>CO</b>
Incinerators	0.16	0.01	0.05	0.01	0.05
Firefighting	5.20	0.02	0.16	13.02	27.70
Heating & Power Production	1.66	0.96	13.98	1.13	3.11
Surface Coating	0.00	0.00	0.00	0.00	0.00
Aerospace Ground Equipment	2.41	1.68	16.90	9.92	16.17
Fuel Evaporation Losses	0.00	0.00	0.00	70.90	0.00
Aircraft Flying Operations	13.01	31.29	156.94	556.19	1570.50
Aircraft Ground Operations	0.72	1.82	7.93	7.27	16.60
Motor Vehicles	4.56	5.08	85.92	19.65	155.83
<b>TOTAL:</b>	<b>27.72</b>	<b>40.86</b>	<b>281.88</b>	<b>725.14</b>	<b>1789.96</b>

Source: Air Pollutant Emissions Inventory, Davis-Monthan AFB 1988.

The data include the four most important air emission source categories: fuel combustion in stationary sources, industrial processes, solid waste disposal, and transportation (mobile sources), as well as a fifth source category, miscellaneous. Stationary fuel combustion sources include both area sources and point sources of fuel used for heat and power in residences, industries, institutions, and commercial buildings. Emissions from industrial processes include only those industrial air pollutants emitted during the manufacturing process. Solid waste disposal emissions include those from all sources of open burning and incineration, while the transportation category includes automobiles, trucks, buses, aircraft, trains, and water transportation vessels. Miscellaneous emission types vary according to the region involved, but most commonly include fugitive dust, solvent evaporation, agricultural burning, forest fires and structural fires.

Based on the air emission inventory, CO, NO<sub>x</sub>, and HC emissions in Pima County derive primarily from transportation-related sources. Primary metal processing (copper) accounts for most of the SO<sub>x</sub> emissions. The particulate emissions occur primarily as fugitive dust resulting from vehicular traffic on unpaved roads.

Table 3.2.3-4

## Pima County, Arizona Air Pollutant Emissions Inventory, 1988 (Tons per Year)

Emission Source	Particulates	SO <sub>x</sub>	NO <sub>x</sub>	HC	CO
Fuel Combustion	1,099	1,760	4,403	1,407	4,377
Industrial Process	308	14,473	0	0	0
Solid Waste Disposal	780	30	125	1,621	4,947
Transportation	10,399	1,430	18,735	16,463	67,078
Miscellaneous	167,197	8	228	13,617	6,540
Davis-Monthan AFB	28	41	282	725	1,790
(Percent of Total)	(0.02)	(0.23)	(1.19)	(2.14)	(2.11)
<b>TOTAL:</b>	<b>179,811</b>	<b>17,742</b>	<b>23,773</b>	<b>33,833</b>	<b>84,732</b>

Source: Environmental Protection Agency 1988.

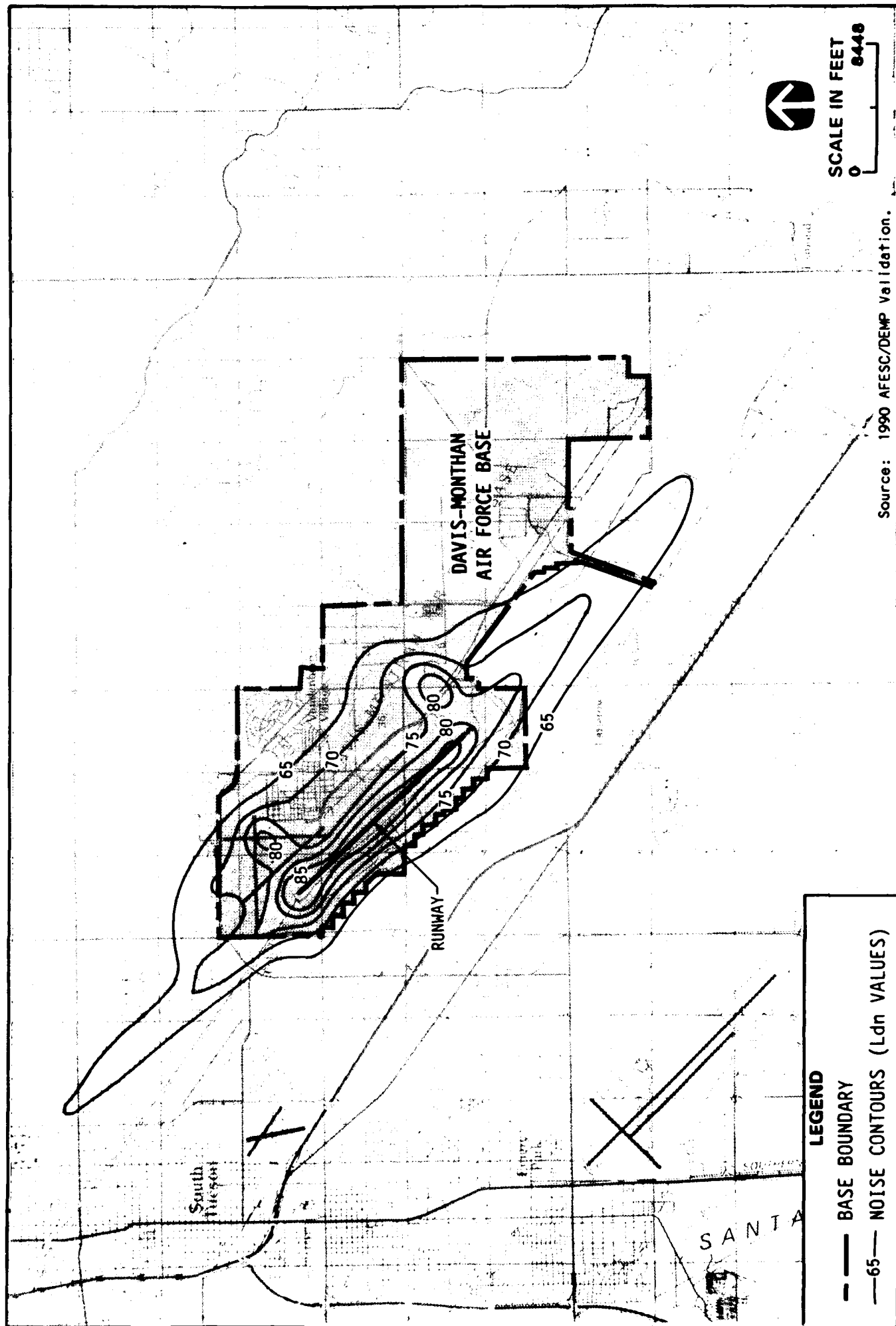
A comparison of pollutant emissions from Davis-Monthan AFB with those from Pima County is presented in Table 3.2.3-4. The total emissions from base and county sources are shown in the table for each pollutant. For all pollutants, the base produces about 1 percent of the county pollution burden.

#### 3.2.3.4 Noise

The principal noise sources in the vicinity of Davis-Monthan AFB are aircraft operations and vehicular traffic on traffic arteries carrying base operations traffic, both onbase and offbase.

The U.S. Air Force Engineering and Service Center recently (1990) conducted an evaluation of noise resulting from aircraft operations at Davis-Monthan AFB. The study used the NOISEMAP model to estimate  $L_{dn}$  noise levels.  $L_{dn}$  is a 24-hour weighted average noise level, and is discussed further in Section 3.1.3.4. The noise levels estimated by NOISEMAP are based on aircraft engine noise levels, operations and performance characteristics, and maintenance support information. Current  $L_{dn}$  noise level contours are shown in Figure 3.2.3-3. Areas along the runway experience  $L_{dn}$  noise levels of 80 dB. Noise levels of 65 to 75 dB occur in portions of Tucson residential and business areas located off the northwest end of the runway. Approximately 980 acres of primarily residential area are exposed to noise levels of  $L_{dn}$  65 to 75 dB. Assuming the overall Tucson population density of 2,600 per square mile (4.1 per acre), an estimated 4,300 persons live in this area. Areas off the southeast end of the runway experience similar noise levels but are largely vacant.

Second to aircraft operations, vehicular traffic on roadways is a major noise source in the vicinity of the base. Major roadways include Golf Links Road, Kolb Road, and Alvernon Way. Because noise measurements were not available along these roadways, the U.S. Federal Highway Administration



noise model STAMINA 2.0 (1982) was used to make noise level estimates at a distance of 100 feet from the roadways. The ADT counts were used to calculate the  $L_{eq}$  (1 hour) and  $L_{dn}$  noise levels. The  $L_{eq}$  (1 hour) noise levels ranged from 68 dB to 73 dB while the  $L_{dn}$  levels ranged from 56 dB to 61 dB. The highest noise levels were found along Golf Links Road.

### 3.2.3.5 Biological Resources

**Vegetation.** The vegetational habitat of Davis-Monthan AFB is classified as Sonoran Desert Scrub and represents an overlap area for the Arizona Upland and the Lower Colorado desert subdivisions. Approximately 50 percent (4,741 acres) of the land area of Davis-Monthan AFB is unimproved and inhabited by natural native plant communities. The remaining base land area (6,022 acres) is devoted to mission activities and consists of graded, altered, or developed land.

Creosotebush-bursage is the predominant vegetative association found onbase. Interspersed within this community are diverse communities dominated by cacti, shrubs, and small trees. Dominant plants found in these communities include prickly pear, chollas, saguaro, and barrel cactus; shrubs such as creosotebush, white bursage, fairy duster, desert broom, and desert hackberry; and trees such as mesquite, palo verde, catclaw acacia, and ironwood. Scattered throughout the open areas of this desert habitat are yuccas, ocotillo, desert spoons, and a variety of grasses including bermudagrass, soft chess, blue grama, sideoats grama, and lovegrass. As in most desert areas, the small amount and irregularity of rainfall limit the development of different plant communities.

**Wildlife.** The creosotebush-bursage vegetative association of Davis-Monthan AFB supports a wide variety of animal life including such species as the coyote, jackrabbit, cottontail rabbit, mule deer, cactus wren, curved bill thrasher, Gambel's quail, Inca dove, and numerous rodents. Bird species present or using the desert-scrub community of the base number more than 120 and include hawks, owls, doves, quail, thrashers, wrens, roadrunners, buntings, sparrows, warblers, and crows. Common reptiles indigenous to the base include species such as the regal horned lizard (*Phrynosoma solaris*), eastern fence lizard (*Sceloporus undulatus*), gopher snake (*Pituophis mclanoliucus*), and western diamondback rattlesnake (*Crotalus atrox*).

Davis-Monthan AFB has a Fish/Wildlife Management Plan (June 1986) for the planning period August 1987 to July 1992. The purpose of the plan is to provide management of base wildlife habitat by applying the principals of multiple use and sustained yield, so as to protect and enhance wildlife habitat without adverse impact on mission requirements. Current and proposed management strategies seek to promote stable populations of wildlife. The two major objectives of the management plan are maintenance of a quality habitat as it exists in the natural ecosystem and providing a quality habitat where it has deteriorated or where a specific habitat element of food, cover, or water is lacking. According to this plan, habitat conditions are good and population trends are stable for all key wildlife species on base.

**Wetlands.** There are no wetlands onbase.

**Threatened and Endangered Species.** Although a large number of federally and state-listed threatened and endangered and statues review (i.e., species under review for possible listing) plant and animal species occur in the vicinity of Davis-Monthan AFB, no evidence has been found to indicate their presence on the base. However, there is a reasonable potential for two species to occur on Davis-Monthan AFB: (1) the federally listed endangered Tumamoc globeberry (*Tumamoca macdougalli*), and (2) the desert tortoise (*Gopherus agassizii*), the Sonoran population of which is currently under petition for listing as threatened or endangered. A survey of the base for these two species is planned.

Table 3.2.3-5 summarizes the rare plant and animal species residing or transient within a 50-mile radius of Davis-Monthan AFB.

#### **3.2.3.6 Cultural and Paleontological Resources**

**Prehistoric Resources.** Prehistoric sites in the Tucson Basin consist primarily of habitation sites, villages, canals, ceremonial mounds, ceramic scatters, rock features, quarries, and limited activity sites. Most sites in the Tucson Basin represent Late Archaic and Hohokam occupations. Hohokam sites are represented by villages, irrigation canals, platform mounds, cremations, ball courts, and ceramic scatters. Hohokam settlements occur most frequently on river terraces and the interface between floodplain and lower bajada landforms. Davis-Monthan AFB is located in a bajada area and site types represent small nonriverine occupations from the Archaic and Hohokam time periods.

A cultural resources overview of Davis-Monthan AFB was completed in 1978 and a Class II sample survey was conducted in 1988. The sample survey encompassed 4,765 acres or 44 percent of the total base acreage. The surveyed parcels were in undeveloped portions of the base (including AMARC), and the survey represents 66 percent coverage of those areas. Excluding AMARC, 85 percent of the undeveloped portion of the base was included in the survey. Eight sites and 139 isolated finds were recorded. Most of the sites were in the eastern portion of the base and include one habitation site, three ceramic scatters, two rock features, and two limited activity sites. Six of these sites are considered potentially eligible for the NRHP but have not been tested or formally evaluated.

The Tucson area was traditionally occupied by the Pima, Tohono O'odham, and Sobaipuri Native American groups. The reservation for the Tohono O'odham Nation is west of Tucson. The Sobaipuris, riverine-oriented gatherers, hunters, and horticulturalists, lived at Bac on the Santa Cruz River and along the San Pedro River, and are now located on the San Xavier Reservation, southwest of Tucson.

**Historic Resources.** Numerous historic resources occur in the Tucson Basin including early settlements, ranches, mining camps, stage stations, military sites, religious sites, roads, railroads, water control features, and refuse disposal sites. Thirty-four historic sites in the basin have been nominated to the NRHP or are potentially eligible. The most famous NRHP structure is the Mission San Xavier del Bac, located directly southwest of Tucson.

Davis-Monthan AFB was established in 1927. One hangar on base (now Building 8030, a hospital logistics center near the north end of the runway) was built in 1932 and is considered potentially eligible for the NRHP.

**Paleontological Resources.** The surficial geology of Davis-Monthan AFB consists of Holocene alluvium and windblown sand. The alluvial deposits are more than 366 meters deep and consist mainly of unconsolidated and semi-consolidated clays, silts, sands, and gravels, which may include salts and gypsum. These sediments are not considered to be fossiliferous. Any fossils that might be present would be Holocene in age and would have limited importance.

Table 3.2.3-5

Rare Plant and Animal Species Residing or Transient Within  
a 50-Mile Radius of Davis-Monthan AFB, Pima County, Arizona

Common Name	Scientific Name	Status		Habitat
		Federal	State	
<u>ANIMALS</u>				
Jaguarundi	<i>Felis yagouaroundi</i>	E	T	Brushy areas, thorn thickets
Beardless Flycatcher	<i>Camptostoma imberbe</i>		T	Dense thickets
Black-Bellied Whistling Duck	<i>Dendrocygna autumnalis</i>		E	Occasional migrant
Masked Bobwhite	<i>Colinus virginianus ridgwayi</i>	E		Brushy areas
Peregrine Falcon	<i>Falco peregrinus</i>	E		Occasional migrant
Southern Bald Eagle	<i>Haliaeetus leucocephalus</i>	E		Occasional migrant
Zoned-Tail Hawk	<i>Buteo albonatus</i>	E	T	Streams
Gila Topminnow	<i>Poeciliopsis occidentalis</i>		T	Sonoran desert scrub
Desert Tortoise	<i>Gopherus agassizi</i>		T	Sonoran desert scrub
Gila Monster	<i>Heloderma suspectum</i>		T	
<u>PLANTS</u>				
Beardless Chinchweed	<i>Pectis imberbis</i>	2		Oak woodlands
Goodding Onion	<i>Allium gooddingii</i>	1		Riparian
Lemmon Cloak Fern	<i>Notholaena lemmoni</i>	2		
Needles Knotweed	<i>Polygonum fusiforme</i>	3C		Riparian
Acuna Cactus	<i>Echinomastus erectocentrus</i> var. <i>erectocentrus</i>	2		Sonoran desert scrub

Table 3.2.3-5, Page 2 of 2

Common Name	Scientific Name	Status		Habitat
		Federal	State	
Nichol Turks Head Cactus	<i>Echinocactus horizonthalonius</i> <i>var. nicholii</i>	E		Sonoran desert scrub
Night-Blooming Cereus	<i>Cereus greggii</i> <i>var. transmontanus</i>	3C		Sonoran desert scrub
Pringle Lip Fern	<i>Cheilanthes pringlei</i>	2		Granite cliffs
Cataiina Beardtongue	<i>Penstemon discolor</i>			
Stout Needle Muhly	<i>Coryphantha scheeri</i> <i>var. robustispina</i>	1		Rocky slopes
Thornber Fishhook Cactus	<i>Mammillaria thornberi</i>	3C		Sonoran desert scrub
Tumamoc Globeberry	<i>Tumamoca macdougalli</i>	E		Desert washes

Notes: E = Endangered; T = Threatened

1. Taxa for which the U.S. Fish and Wildlife Service has enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered species.
2. Taxa for which there is some evidence of vulnerability, but for which there are not enough data to support listing proposals at this time.
- 3C. Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat.

Source: U.S. Department of the Interior, Fish and Wildlife Service 1987, 1990.

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### **3.3**

### **ENGLAND AIR FORCE BASE, LOUISIANA**

England AFB is a Tactical Air Command (TAC) base. Military flying activities began at the base in 1939, when it served as an emergency airstrip for Esler Army airfield. During World War II, the Army Air Corps took possession and expanded facilities to train B-17 pilots and later B-29 pilots. The base's designation then was Alexandria Army Air Base. In 1946, the base was deactivated and placed in standby status with the city having "use privilege" as a municipal airport. With the outbreak of hostilities in Korea in 1950, the Air Force reactivated the base as Alexandria AFB. It was assigned to the TAC to train tactical fighter units. In June 1955, the base was named England AFB in honor of Lieutenant Colonel John B. England.

Since its reopening, England AFB has been the home of many different aircraft with widely varying missions. When reopened, the primary aircraft was the F-84. It has since been home for various TAC units flying aircraft such as the F-80, T-33, F-86, F-100, and A-7. Since July 1972, the 23rd TFW, TAC, has been the host unit on base. The 23rd TFW currently flies the Fairchild Republic A-10 Thunderbolt II aircraft.

#### **3.3.1**

#### **Local Community**

England AFB is located approximately 5 miles west of downtown Alexandria, Louisiana. Both Alexandria and the base are located in Rapides Parish (the Louisiana equivalent of a County), in central Louisiana (Figures 3.3.1-1 and 3.3.1-2). Other communities in the area include Pineville, Boyce, Rapides Station, and Gardner. The base lies approximately 1 mile south of the Red River, which also flows through Alexandria.

The climate at England AFB is generally subtropical and humid with warm summers and mild winters. A prevailing southerly windflow produces movement of maritime air from the Gulf of Mexico helping to temper summer heat, shorten the duration of winter cold outbreaks, and provide a source of abundant moisture. Annual rainfall is slightly more than 58 inches. Severe local storms can occur in all seasons, but are most frequent in the spring. Large hail storms or tornadoes are rare. Tropical cyclones are usually in the dissipating stage by the time they reach England AFB and are seldom destructive. The average temperature is 48°F in January and 83°F in July.

The Alexandria area lies within the Red River Valley subdivision of the West Gulf Coastal Plain Physiographic Province. The valley land surface is level to gently sloping. Area streams have developed nearly level, broad floodplains. The most prominent visual features of the region consist of the dissected terraces flanking the valley, which are the remnants of former floodplains. Valley elevations range from 40 feet above sea level in Avoyelles Parish (east of the base) to 205 feet near Shreveport (northwest of the base). Outside the valley, at Flatwoods in Rapides Parish, surface elevations reach a maximum of 310 feet (MSL). In Rapides Parish, elevation change is greatest at the Kisatchie Hills (south of the base), where it approaches 100 feet.

At England AFB, surface elevations vary from 75 feet MSL in the drainage channel adjacent to the golf course to 90 feet MSL along the west installation boundary. Changes in elevation are seldom more than 5 feet and normally occur as a gentle slope. The greatest variations in elevation are along major water courses, such as Bayou Rapides.

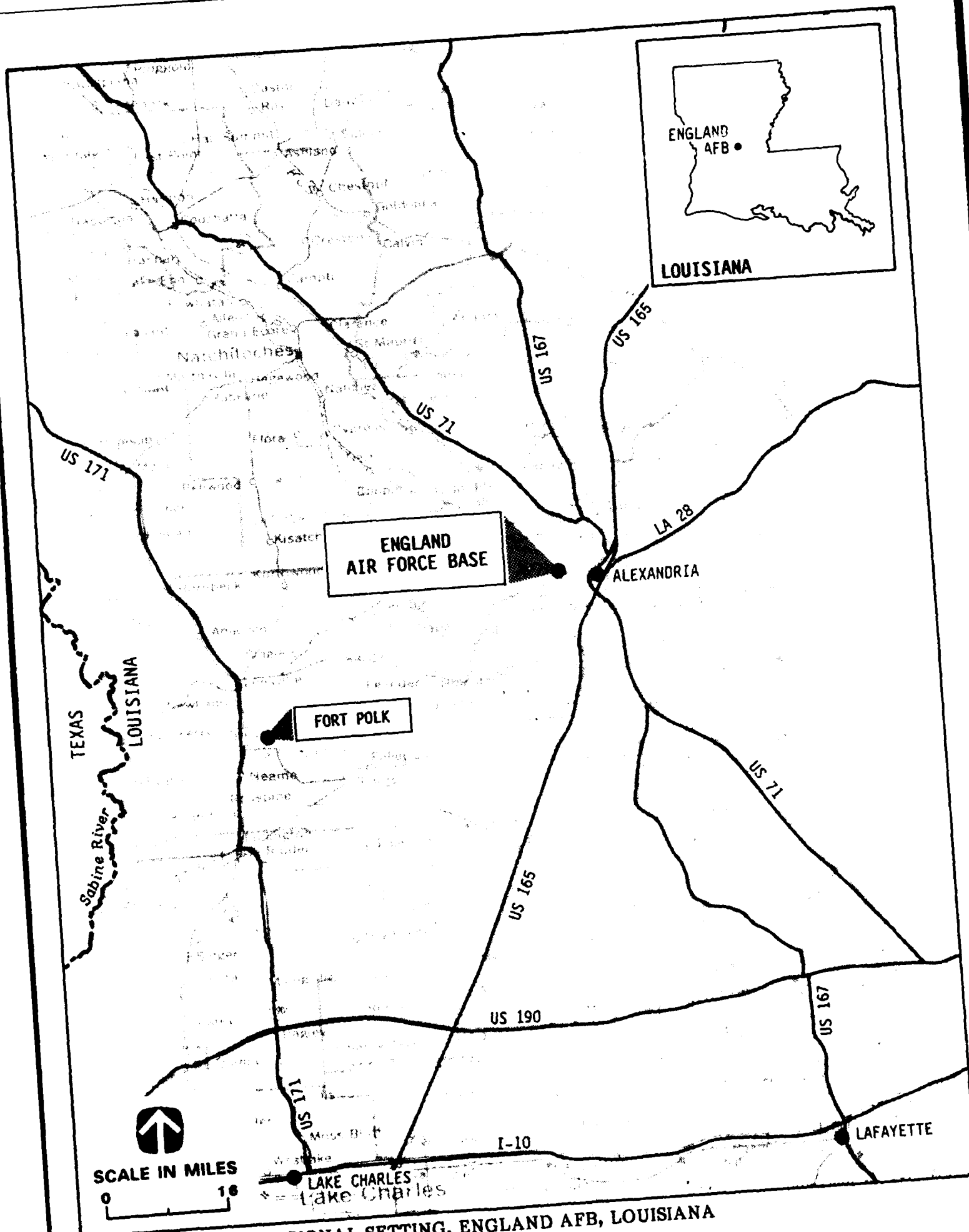


FIGURE 3.3.1-1 REGIONAL SETTING, ENGLAND AFB, LOUISIANA

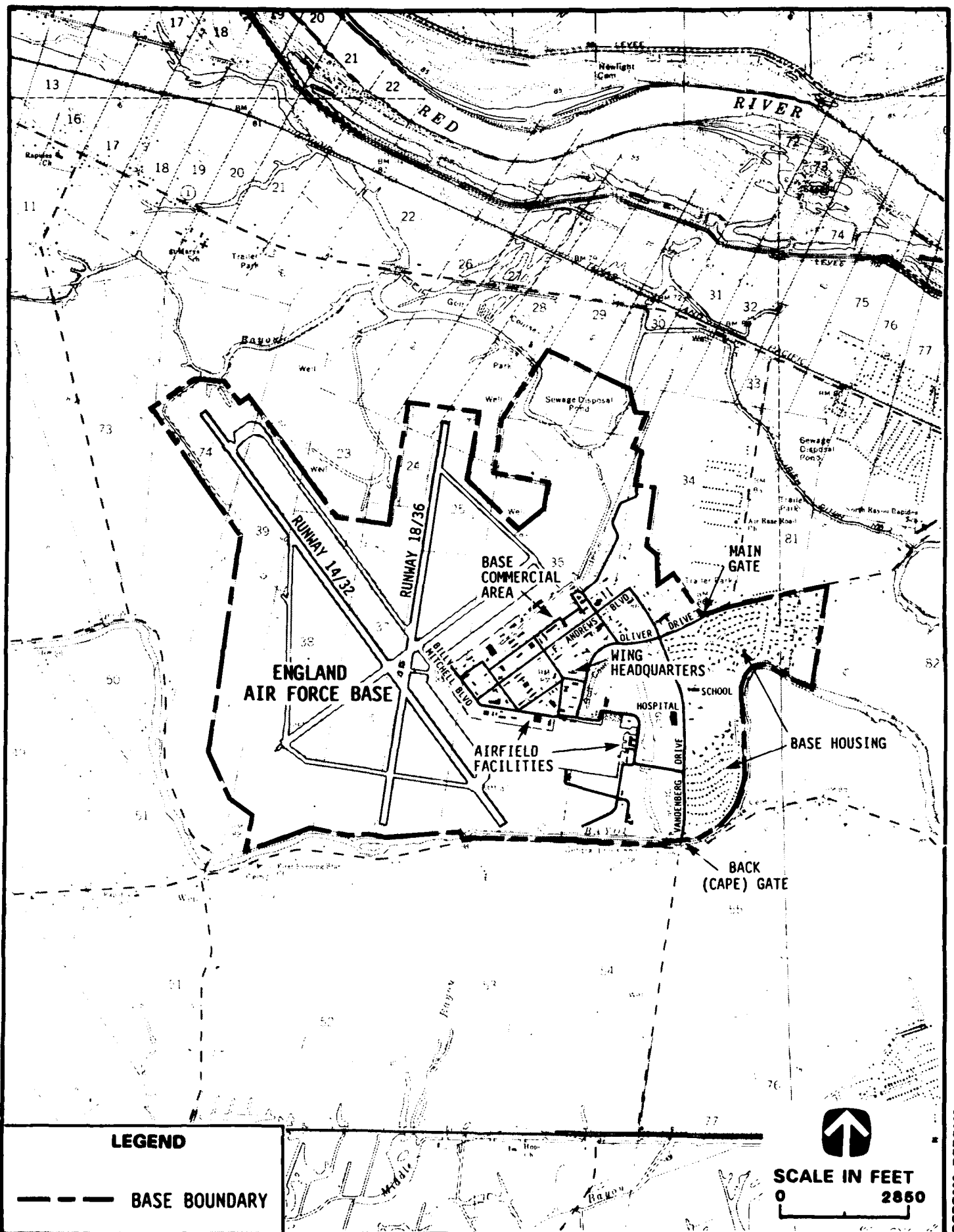


FIGURE 3.3.1-2 ENGLAND AFB, LOUISIANA AND VICINITY

### **3.3.1.1 Community Setting**

At the end of fiscal year (FY) 1989, England AFB employed a total of 3,293 military personnel, 604 appropriated fund civilian personnel, and 356 other civilian personnel (ERIS 1989). Approximately 42 percent of the military personnel live onbase, and 58 percent live in communities near the base. The base population is 4,693, which consists of the military personnel and their dependents who live onbase. Approximately 7,800 military retirees live in the base vicinity. In addition to direct employment of civilians on the base, spending by the base and base employees provides secondary employment for approximately 1,400 other civilians in the local area.

As a result of fiscal and other constraints independent of base closure, personnel authorizations will be reduced over the next several years. By the fourth quarter of FY 1991, personnel authorizations will be reduced to 3,122 military (299 officers and 2,823 enlisted) and 553 civilian personnel. The actual numbers of personnel will probably be slightly lower than the authorizations. By FY 1992, secondary employment is projected to be approximately 1,200.

The community surrounding England AFB is expected to grow at a moderate rate of approximately one percent per year over the next decade. By the year 2000, Rapides Parish will have a population of approximately 154,000, and the City of Alexandria will have a population of approximately 57,000.

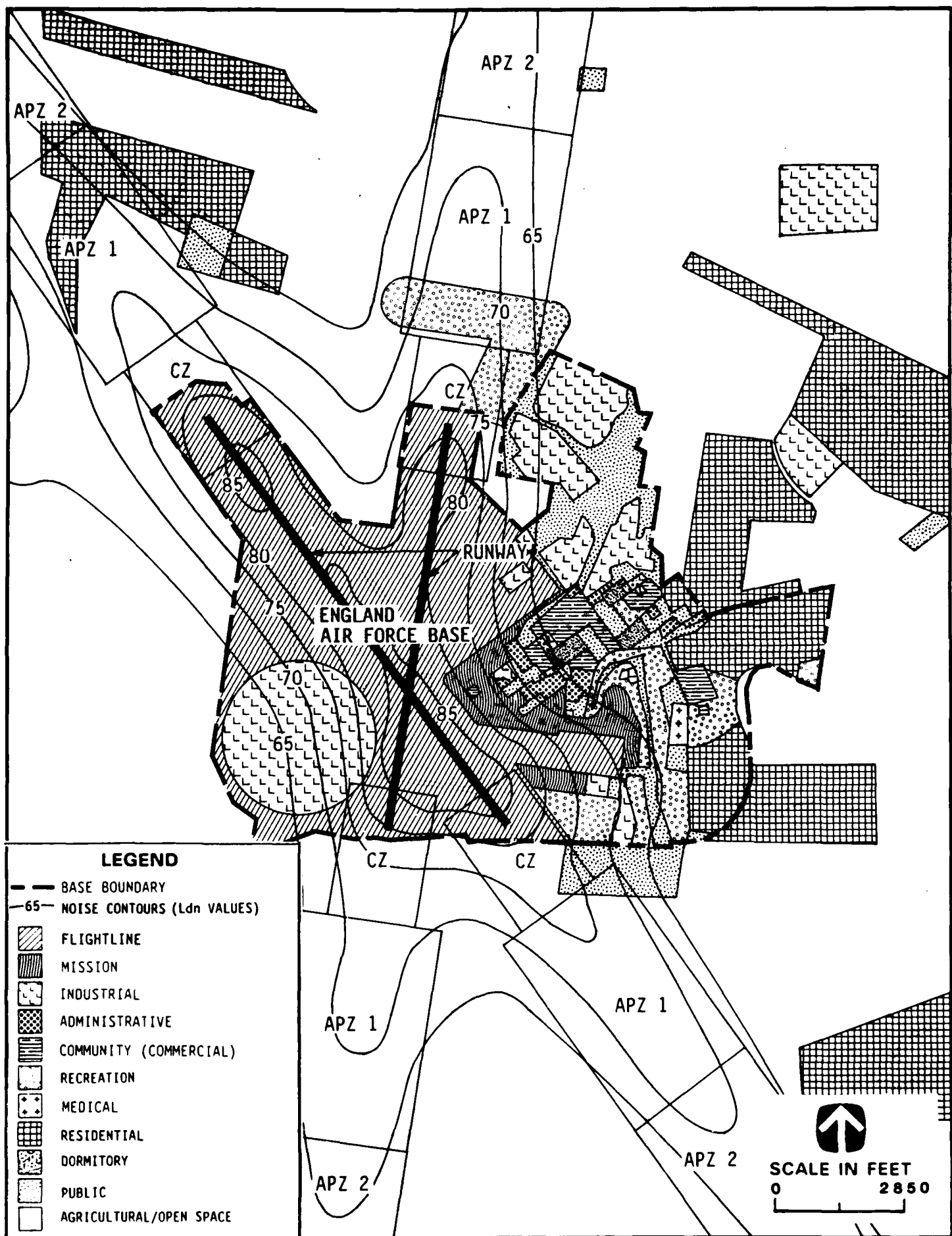
Employment in Rapides County is based primarily on the agricultural, governmental, light industry, wholesale trade, and retail trade sectors. The agricultural sector accounted for 38 percent of civilian employment in 1986. The civilian labor force was 60,465 and the number of people employed was 54,126 in 1986.

### **3.3.1.2 Land Use and Aesthetics**

*Land Use.* England AFB is outside the city limits of Alexandria. The base occupies 2,604 acres of land, or just over 4 square miles. There are 1,045 acres of improved land; 1,463 acres of semi-improved grounds; and 96 acres of unimproved land. There are 598 accompanied housing units and seven dormitories for unaccompanied housing.

Most of the land uses surrounding England AFB are low density; community facilities and industrial land uses are scattered throughout the area (Figure 3.3.1-3). Land uses north and west of the base are restricted by the Red River and marshland. Residential development is occurring northeast of the base along Air Base Road and State Highways 1 and 498. The southern edge of the base runs along the Bayou Rapides and State Highway 496, and areas south of the bayou are largely undeveloped and agricultural. Patterns of further urban development are most likely to result from suburban expansion between the base and Alexandria.

Additional land offbase includes the Claiborne Range, an air-to-ground training location approximately 12 miles south of the base in Kisatchie National Forest. The range covers approximately 24,659 acres, of which the Air Force impact area is 672 acres. The range land is owned and managed by the National Forest Service. The Air Force operates the range under a 5-year permit for mission-related activities. A recreation area is located 10 miles west of the base at Cotile Lake, and is approximately 38 acres in size. Cotile Lake is leased on a 5-year basis from a private landowner. England AFB also utilizes a radar station approximately 4 acres in size, known as the



Lake Charles Air Force Station, in cooperation with Fort Polk. The station is located near Lake Charles, Louisiana.

Issues related to onbase land use, development, and capital improvements are addressed in the *Commander's Long Range Facility Improvement Plan - England 2000* (1990). The plan summarizes existing land uses, needs and constraints, and goals and objectives. The plan also guides base physical facilities planning for the future with efficient, economical goals while protecting environmental and cultural resources. The plan emphasizes long-range planning to meet the development needs of the base towards the implementation of England AFB's missions. The plan recognizes the base's social and community responsibilities to the City of Alexandria. Land use decisions within the flight operations area of the base are addressed in the England AFB Air Installation Compatible Use Zone (AICUZ) Report (1983). AICUZ recommendations are used as a guide for land use planning by Rapides Parish and the City of Alexandria.

The ten land use zones on the base are identified as follows: mission functions, industrial support, administration facilities, community facilities, medical support, unaccompanied housing, accompanied housing, outdoor recreation, open space, and airfield. Improved or developed land is concentrated in the eastern half of the base, and the airfield occupies the western half of the base property. Residential (accompanied) units are found along the far eastern boundary of the base. Administrative, community, and unaccompanied housing facilities are found in the improved area in the eastern portion of the base. Industrial uses and open space are primarily found in the northeastern portion of the base.

In May 1989, the Rapides Parish Police Jury, the parish legislative body, adopted the Airbase Landing District Ordinance. This ordinance is an effort to prevent incompatible land uses from surrounding the base. It is the jury's intention to cooperate with the base's mission and to protect the community and its property from mission-related hazards.

The City of Alexandria followed the parish's actions by enacting an ordinance entitled the *Airfield Compatibility (A-C) Zone*. This zoning is based on the parish ordinance and the England AFB AICUZ recommendations. The ordinance identifies Clear Zones, APZ 1, and APZ 2 at the ends of the primary and secondary runways.

Land use in the Clear Zones is restricted to transportation, communication, utilities, and agriculture. In APZ 1, no residential structures are allowed. Business and commercial development density and heights are limited. Single family homes comprise the largest number of nonconforming uses found in APZ 1, north of the primary runway. These nonconforming uses existed prior to the adoption of the Airbase Landing District Ordinance. In APZ 2, two residential dwelling units per acre are allowed. As a result of the zoning ordinance, the number of hazards posed by nonconforming uses should not increase.

England AFB has adopted guidelines to ensure compatible architectural and natural resources. These guidelines stress an open, natural environment that is functional for the base's mission as well as being visually pleasing. Natural resources such as native vegetation are incorporated into landscape planning and are compatible with the bayou region surrounding the base.

**Aesthetics.** The style best describing the buildings onbase is contemporary/modern. The emphasis of their layout is to promote compatibility of styles and functions, durability, and efficiency. Five basic functional areas best describe base structures: administrative, community services, and dormitories; operations and maintenance; support and industrial; mobility; and family housing. Structural detailing

and materials are modest on administrative and community facilities. Family housing structures closely resemble an offbase residential subdivision in style and layout. Because of the mild climate and long growing season, a wide variety of vegetation is successful for providing shade, screening, and beautification.

### 3.3.1.3 Transportation

**Transportation Systems.** The principal roadways serving England AFB and vicinity are shown on Figure 3.3.1-4. State Highways (LA) 1 and 498 provide access to the Main Gate/Visitors Center entrance. State Highways (LA) 496 and 28, and Vandenberg Drive provide access to the Back (Cape) Gate. The Cape Gate intersection is signalized. Other principal highways in the study area include U.S. Highways 71, 165, and 167, southeast of England AFB. Interstate 49, which will pass near Alexandria, is under construction north and east of the base.

Commercial air service is available at Esler Airport approximately 13 miles northeast of England AFB. Five commercial airlines operate an average of 18 flights per day out of this airport. Freight rail service is provided by the Missouri and Pacific line. This east-west line is north of the base and follows the State Highway 1 corridor. Passenger rail service is not provided in Alexandria or Pineville.

**Ground Traffic.** Traffic volumes for the major roadways serving England AFB are presented in Table 3.3.1-1. Traffic volume represents ADT passing a segment of a corridor during a non-peak 24-hour period. As the level of service (LOS) values in the table indicate, traffic in the vicinity of the base is generally free flowing. Vehicle trips generated directly by the base are presented in Table 3.3.1-1.

**Air Traffic.** England AFB is a dedicated military installation. Commercial and general aviation aircraft are not permitted to land at England AFB except in emergency situations. England AFB has two runways: Runway 14/32, which is 9,350 feet long, and Runway 18/36, which is 7,000 feet long. Runway 14/32 is used for approximately 90 percent of England AFB air operations. Total aircraft operations in 1989 at England AFB were 48,000 (24,000 sorties), including 44,458 operations by based A-10 aircraft and 3,642 transient operations. Esler Regional Airport generated 45,134 commercial aircraft operations in 1989. Other commercial airports in the vicinity of England AFB include Pineville, Marksville, Bunkie, Natchitoches, Jena, Pollock, Summerville, and Woodworth (Figure 3.3.1-5).

Air traffic control for military and civil aircraft operating in the vicinity of England AFB is provided by Alexandria Approach Control and Houston Air Route Traffic Control Center (ARTCC). Alexandria Approach Control is a jointly operated (FAA/USAF) facility at England AFB and provides radar coverage for all aircraft from the surface to 10,000 feet MSL for a radius of 60 miles, excluding certain Special Use Airspace areas. Air traffic above 10,000 feet MSL is controlled by Houston ARTCC.

England AFB is surrounded by Special Use Airspace and Military Training Routes which are designated for military training activities (Figure 3.3.1-5). England AFB is responsible for scheduling airspace activity in three Restricted Areas (R-3801, R-3801C, and R-3806), three MOAs (Jena MOA, Hotrock MOA, and India MOA), two Military Training Routes (IR-160 and IR-161), and one Air Refueling Track (AR-615). Aircraft from England AFB, Barksdale AFB, and the New Orleans Air Force Reserve (926 TFG) use these areas for training activities. Special Use Airspace and Military Training Routes scheduled by England AFB and used by the 23rd TFW are shown in Table 3.3.1-2.



**Table 3.3.1-1****Existing Traffic Conditions for  
Roadways in the Vicinity of England AFB**

<b><u>Roadway Segment</u></b>	<b>1990 ADT Volume</b>	<b>Volume-to-Capacity (V/C) Ratio</b>	<b>LOS</b>
Airbase Road south of LA 1	3,363	0.24	A
LA 498 east of Air Base Road	758	0.05	A
LA 1 south of Air Base Road	14,285	0.22	A
LA 496 east of Vandenberg Drive	2,592	0.17	A
Vandenberg Drive north of LA 28	4,742	NA <sup>1</sup>	B
LA 28 west of Vandenberg Drive	4,535	NA	A
LA 28 east of Vandenberg Drive	11,815	NA	C

Notes: <sup>1</sup>Not available

LOS = Level of Service:

A = Free-flow operations: high average speeds and unimpeded maneuverability (V/C ratio  $\leq 0.40$ ).

B = Reasonably free-flow operations: above average speeds and slight impacts on maneuverability (V/C ratio 0.41 - 0.55).

C = Stable operations, typically meets design standards: some speed restrictions as a result of congestion and noticeably restricted freedom to maneuver (V/C ratio 0.56 - 0.75).

D = Borders on unstable flow: speeds reduced by congestion and severely limited freedom to maneuver (V/C ratio 0.76 - 0.90).

E = Extremely unstable flow: virtually no usable gaps in the traffic stream to maneuver from one lane to another without causing disruption to traffic flow (V/C ratio 0.91 - 1.05).

F = Forced or breakdown flow: intermittent traffic stoppage in a lane and queues behind breakdown points (V/C ratio  $> 1.06$ ).

Source: Rapides Parish Planning Commission 1990.

Special Use Airspace scheduled by nearby DOD installations and used by England AFB aircraft for air-to-ground training is shown in Table 3.3.1-3.

Air traffic conflicts throughout the region are prevented by coordinated air traffic control between England control tower, Alexandria Approach control, and Esler Regional control tower. Air traffic in the vicinity of the Jena MOA and the Hotrock 2 MOA is permitted to enter and transit this Special Use Airspace at all times provided that a minimum altitude of 3,000 feet MSL and a maximum altitude of 6,000 feet MSL is maintained.

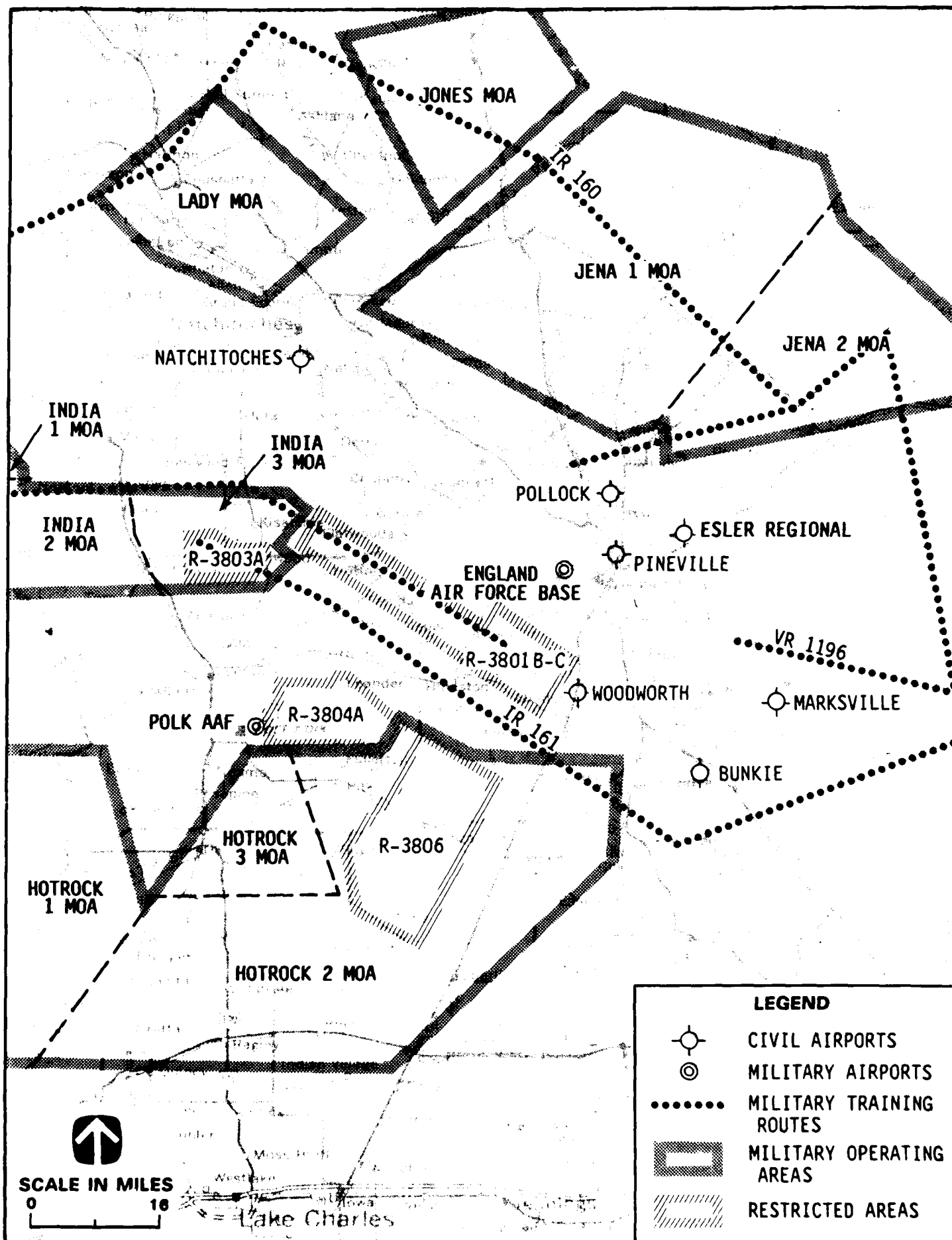


FIGURE 3.3.1-5 AIRPORTS AND AIRSPACE SURROUNDING ENGLAND AFB, LOUISIANA

Table 3.3.1-2

**Special Use Airspace and Military Training Routes  
Scheduled by England AFB**

Type/Designation	Area	Altitude Block
<u>Restricted Area</u>		
R-3801	110 sq mi	500 ft AGL to 4,000 ft MSL
R-3801C	145 sq mi	7,000 ft AGL to 14,000 ft MSL
R-3806	361 sq mi	500 ft AGL to 7,000 ft MSL
<u>Military Operating Area (MOA)</u>		
Jena	1,410 sq mi	100 ft AGL to 18,000 ft MSL
Hotrock	1,735 sq mi	100 ft AGL to 18,000 ft MSL
India	790 sq mi	500 ft AGL to 8,000 ft MSL
<u>Military Training Route</u>		
IR-160	N/A	Low Altitude
IR-161	N/A	Low Altitude
<u>Air Refueling Track</u>		
AR-615	N/A	

Table 3.3.1-3

**Special Use Airspace Used by England AFB,  
But Scheduled by Other Agencies**

Airspace	Using Agency (Scheduler)	Approximate Distance from England AFB
R-3803	Ft. Polk, LA	35 mi (west)
R-3804	Ft. Polk, LA	25 mi (southwest)
R-6302	Fort Hood, TX	255 miles (west)
R-2402	Fort Chafee, AR	240 miles (north)
R-4401	Camp Shelby Ang., MS	180 miles (east)

#### **3.3.1.4 Utilities**

**Water Supply.** Drinking water for England AFB is supplied by the City of Alexandria Water Department. In 1989, the base consumed a total of 179 million gallons in 1989 or an average of 14.9 million gallons per month. The total number of gallons consumed by the base in 1989 represented 2.1 percent of the total 8.4 billion gallons produced by the City of Alexandria Water System.

**Wastewater.** Wastewater from England AFB is treated at the Alexandria Treatment Plant, which is managed by the city. Wastewater is supplied to the plant by a 30-inch gravity-feed main. The peak capacity of the Alexandria plant is 12 MGD. Planned improvements to the plant will increase the peak capacity of the plant to approximately 15 MGD. The plant currently maintains an average daily flow of 9.5 to 10 MGD. The base supplies 3.1 percent of the total average daily flow to the plant. In 1989, the base wastewater flow was 109,750,000 gallons.

**Solid Waste.** Solid waste generated by England AFB is disposed of in the Alexandria landfill, which is managed by Waste Management of Central Louisiana. This landfill is scheduled to close in September and a new landfill site has not yet been determined. Currently the base produces an estimated 1,200 cubic yards per month of residential and commercial waste. The residential and commercial waste produced by the base is approximately 3 percent of the total month's average of 38,000 cubic yards received at the landfill.

**Energy.** Electrical service is provided to the base by the Central Louisiana Electrical Company (CLECO). In 1989, the base consumed a total of approximately 42 million kWh. In 1989, electrical power provided to England AFB represented 0.75 percent of CLECO's statewide total volume, estimated at 5.6 billion kWh, or 5.2 percent of the total volume within Rapides Parish, estimated at 807 million kWh.

The City of Alexandria supplies natural plant gas service to England AFB. In 1989, a total of approximately 104 million cubic feet (MMcf), or an average of 8.7 MMcf per month, were consumed by the base. The gas used by the base represents 4.4 percent of the total 2,400 MMcf generated by the City of Alexandria in 1989.

#### **3.3.2 Hazardous Materials/Waste Management**

##### **3.3.2.1 Hazardous Materials Management**

Hazardous materials are used and temporarily stored at Base Supply and other industrial facilities throughout England AFB which are operated to maintain, repair, and recondition a wide variety of military equipment. Common operations at the industrial facilities include paint stripping, parts cleaning, and painting (Table 3.3.2-1). Most of the hazardous materials associated with these operations include solvents, paint strippers, and paints. Other hazardous materials used and stored at the base include fuels (e.g., JP-4, diesel) oils, herbicides and pesticides, and a variety of chemicals (e.g. sulfuric acid, chlorine, acetone, methanol), and munitions.

Management of hazardous material storage, use, and spill prevention and control at England AFB is outlined in various plans which include the Underground Storage Tank Management Plan (April 1988) and the Pollution Abatement Plan (1980, updated 1990).

**Aboveground and Underground Storage Tanks.** England AFB has 26 aboveground tanks used to store petroleum products such as diesel fuel, JP-4, heating oil, and gasoline. Sizes range from 300 to

**Table 3.3.2-1**

**Industrial Operations Using Hazardous Materials, England AFB**

<b>Operation</b>	<b>Location (Building Number)</b>
<b>Equipment Maintenance Squadron (EMS)</b>	
Non-Destructive Inspection (NDI) Lab	2528
Corrosion Control Shop	2502
Aerospace Ground Equipment (AGE)	120
Wheel and Tire Shop	814
Armament Systems Shop	2108
Phase Inspection	2502
Welding Shop	2502
<b>Component Repair Squadron (CRS)</b>	
Jet Engine Shop	2102
Pneumatic/Hydraulic Shop	2502
Battery/Electric Shop	2502
Jet Engine Test Cell	2618
<b>Combat Support Group (CSG)</b>	
Photo Lab	1009
Auto Hobby Shop	1434
<b>Civil Engineering Squadron (CES)</b>	
Fire Department	500
Fire Department Training Area	2408
Electric Shop	1703
<b>Aircraft Generation Squadron (AGS)</b>	
74th AMU	2502
75th AMU	2102A
76th AMU	525
<b>Transportation Squadron</b>	
Vehicle Maintenance	1707
Refueling Maintenance	2401
<b>Army-Air Force Exchange Service (AAFES)</b>	
Gas Station	1800
<b>USAF Hospital</b>	3609

**Source:** Hazardous Materials Technical Center, *Hazardous Waste Management Survey, England Air Force Base, Louisiana*, April 1988, and an EPA onsite investigation conducted January 8 through January 11, 1990.

420,000 gallons. Most of the aboveground storage tanks are surrounded by a secondary containment system equal to the volume of the storage tank, plus one foot of freeboard.

England AFB has 28 USTs, 22 of which are regulated under Title 40 CFR 280.10 through 280.74. All existing USTs are currently in use. The nonregulated tanks are those containing diesel fuel for various buildings throughout the base. The regulated tanks contain petroleum products such as diesel, JP-4, and gasoline and range in sizes from 500 to 10,000 gallons (Table 3.3.2-2). Most storage tanks have had leak detection devices installed. These devices became operational July 1, 1990. The storage tanks in the POL area will have the devices installed by July 30, 1990. Tank performance standards, operating requirements, monitoring, release reporting, investigation, confirmation, response, and corrective actions are detailed in the Underground Storage Tank Management Plan for England AFB (April 1988).

**Pesticides/Herbicides.** A variety of chemicals are used at England AFB to control pest infestations and ground foliage. Pesticide management activities at the base are performed by the BCE Entomology Shop and must meet requirements as specified in Air Force Regulation 19-21. Approximately 500 gallons and 3,000 pounds of assorted insecticides and herbicides are stored at Building 1701.

**Other Hazardous Materials.** Corrosives, acids, compressed gases, and various other hazardous materials are received and stored temporarily at a designated area within Base Supply. Materials are checked and assigned a hazard code prior to distribution or storage.

### **3.3.2.2 Hazardous Waste Management**

England AFB is a generator of hazardous waste and operates a Treatment, Storage, and Disposal (TSD) Facility. Approximately 8,500 pounds of hazardous waste are generated per month by activities such as spray painting, solvent degreasing, paint removal, laboratory analysis, open detonation of unserviceable munitions items, and corrosion control. The facilities listed in Table 3.3.2-1 routinely generate hazardous wastes. The majority of the hazardous waste generated included spent solvents, paint strippers, and waste paints. Other wastes generated at the base include waste oils, waste hydraulic fluids, storage batteries, alkaline descaling compounds, photo development chemicals, used medical equipment, biological medical wastes, and other chemical products that have exceeded their shelf lives. A Hazardous Waste Management Plan (April 1988) has been prepared and implemented to ensure compliance with RCRA requirements for the base. A Waste Minimization Plan (April 1988) has been developed to provide information and procedures to reduce and minimize the generation of hazardous wastes at the base.

All hazardous wastes are placed in designated containers (55-gallon drums) at the point of generation. The containers are then taken to one of four designated hazardous waste accumulation points onbase. Storage at the accumulation points is temporary and cannot exceed 90 days from the time the waste begins to accumulate. Table 3.3.2-3 lists the four designated accumulation points.

**Treatment, Storage, and Disposal Facilities.** Two locations treat, dispose of, or store hazardous materials for more than 90 days. These TSD facilities are the Defense Reutilization and Marketing Office (DRMO) Building 2532, and the EOD Range at Claiborne Range. These facilities are operated under RCRA regulations CFR 265. The permit application for the DRMO facility was submitted to the State of Louisiana Department of Environmental Quality. The permit application for the EOD Range was submitted to the EPA, Region VI. The TSD facilities are operating on an interim status until the permit applications are approved.

**Table 3.3.2-2****Regulated Underground Storage Tanks at England AFB**

<b>Location (Building)</b>	<b>Capacity (Gallons)</b>	<b>Contents</b>
1800-1	10,000	Unleaded
1800-2	10,000	Unleaded
1800-3	5,000	Unleaded
1800-4	5,000	Diesel
3509	6,000	Diesel
1630	500	Diesel
3011	1,000	Diesel
3016	1,000	Diesel
1905	550	Diesel
120-1	2,000	Unleaded
120-2	1,000	Diesel
120-3	4,000	JP-4
2409	5,000	Diesel
500-1	550	Diesel
550-2	550	Unleaded
1709-1	10,000	Unleaded
1709-2	10,000	Unleaded
1709-3	10,000	Diesel
1709-4	10,000	Diesel
610	500	Diesel
524	500	Unleaded

Source:        Underground Storage Tank Management Plan, England AFB, 1988.

The DRMO is responsible for all hazardous wastes except for the categories cited in the Defense Environmental Quality Program Policy Memorandum (DEQPPM) 80-5, and unserviceable munitions items which are the responsibility of the EOD Range. Unserviceable munitions items are detonated or thermally treated at the EOD range. After treatment, residue is sorted and items which can be certified safe are containerized and sent to DRMO as scrap metal. Items which cannot be certified safe are returned, and the ash is accumulated and processed through DRMO as an Extraction Procedure toxic hazardous waste. Hazardous waste stored at the DRMO is transported offbase for

Table 3.3.2-3

**Hazardous Waste Accumulation Points  
on England AFB**

<b>Organization</b>	<b>Building</b>
76th AMU Support Section	529
Propulsion Branch	2,104
Refueling Maintenance	2,405
NDI LAB	2,519

Source: Hazardous Waste Management Plan, England AFB, 1988.

final disposal or recycling/reclamation at a licensed TSD facility in accordance with its permit under a service contract managed by Defense Reutilization and Marketing Service (DRMS).

### 3.3.2.3 Installation Restoration Program Sites

As authorized under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA), the Air Force Installation Restoration Program (IRP) is a subcomponent of the DOD's Defense Environmental Restoration Program. The IRP is designed to identify, investigate, and cleanup past contamination from hazardous substances. (See Section 3.1.2.3 for additional discussion on IRP.)

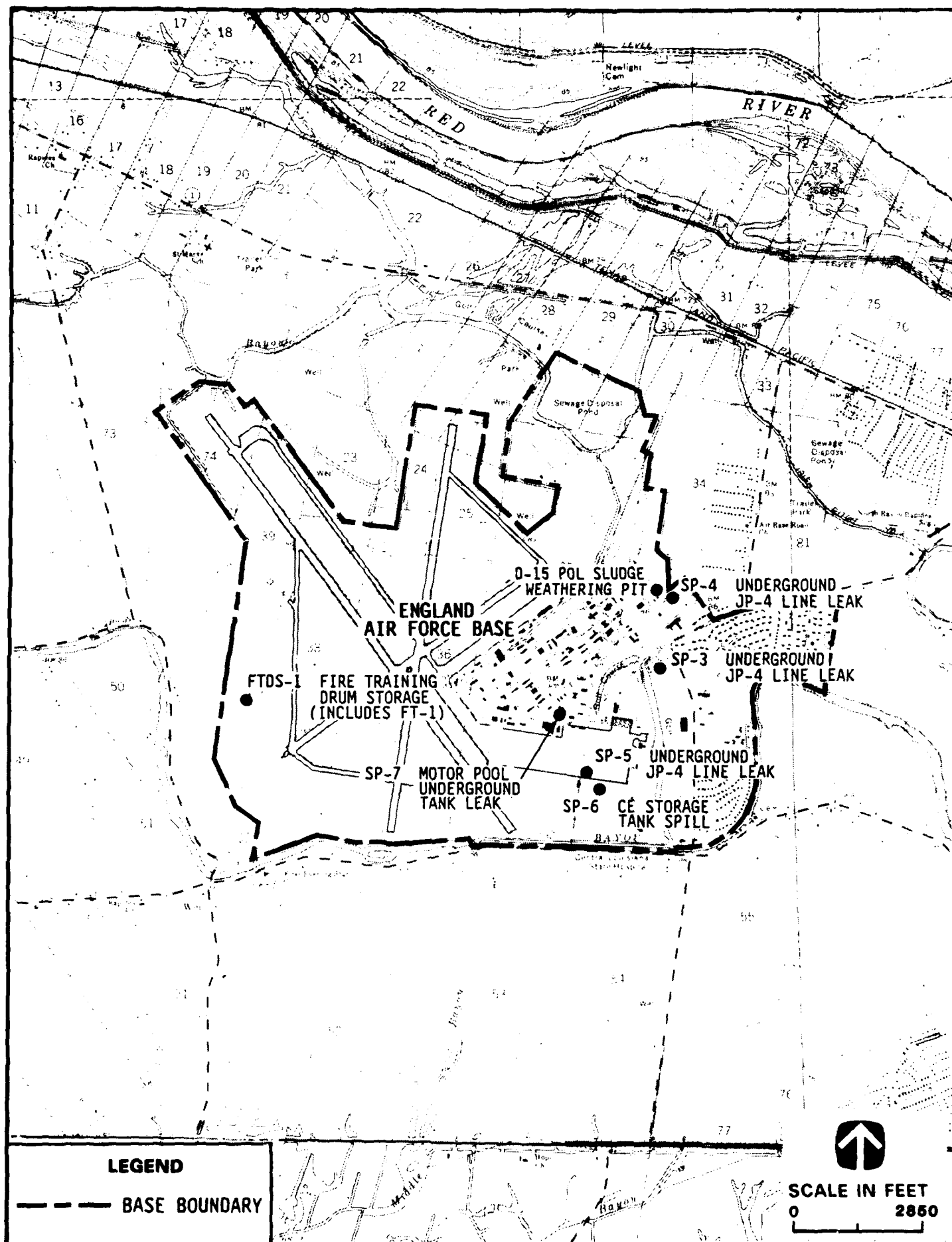
At England AFB, the comprehensive IRP was implemented in 1982 to identify, report, and correct potential environmental deficiencies that could result in contamination and/or migration of contamination beyond base boundaries. The Phase I, Problem Identification/Records Search was completed in 1983 and involved a review of past and present industrial operations conducted at the base. Applicable federal, state, and local agencies were also contacted for pertinent base-related environmental information. The collected information was used to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from the various base operations and to identify all known past disposal sites and other possible sources of contamination. Table 3.3.2-4 shows the ranking of the sites identified in Phase I. In Phase II, the sites identified in Phase I were investigated in more detail, including field sampling and monitoring, in order to determine what type of remediation was required for each site. If no contamination potential existed, the site was deleted from further consideration under IRP. Newly identified sites were also investigated. The Phase II Remedial Investigation (RI) Report was completed in 1989. The sites included in the final RI report are described below and shown on Figure 3.3.2-1.

**FTDS-1 Fire Training Drum Storage Site 1.** The FTDS-1 Site was used from the early 1940s until 1964 to store 55-gallon drums of waste oils and sludges generated by refueling and aircraft maintenance operations. The total capacity of the site was thirty 55-gallon drums. When this site was active, waste material was mixed with JP-4 and burned at the adjacent Fire Training Area 1 (southeast of the drum storage); this process occurred approximately two times per month. This site was investigated under a previous RI conducted at England AFB, and the findings of that study are summarized below.

**Table 3.3.2-4**  
**Ranking for Phase I IRP Sites**  
**England AFB**

<b>Rank</b>	<b>Site Name</b>
1	FT-1 Fire Training Site No. 1
2	D-15 POL Sludge Weathering Pit
3	SP-4 Underground JP-4 Line Leak
4	SP-5 Underground JP-4 Line Leak
5	FT-3 Fire Training Site No. 3
6	SP-3 Underground JP-4 Line Leak
7	SP-2 Tank 1319 JP-4 Spill
8	S-1 Waste Oil Storage Tank
9	D-3 General Refuse Disposal Site
10	D-8 Chlorine Gas Cylinder Disposal Site
11	D-10 Hazardous Chemical Burial Mound
12	S-6 Lake Charles Drum Storage Site
13	FT-2 Fire Training Site No. 2
14	FT-4 Fire Training Site No. 4
15	D-4 General Refuse Disposal Site
16	D-5 General Refuse Disposal Site
17	SP-6 CE Tank Spill
18	SP-7 Motor Pool Underground Tank Leak
19	RD-1 Low-Level Radioactive Waste Disposal Site
20	RD-2 Low-Level Radioactive Waste Disposal Site

**Source:** Phase I IRP Report, England AFB, 1983.



**FIGURE 3.3.2-1 INSTALLATION RESTORATION PROGRAM (IRP) SITES, ENGLAND AFB, LOUISIANA**

FTDS-1 is characterized by relatively low concentrations of chemicals of concern. Soil studies indicated that all detected priority pollutant metals were within the background range for the location. There was no evidence of other than naturally occurring metals. Organic compounds were present at relatively low levels and decreased in concentration with depth. Groundwater studies indicated that all the priority pollutant metals present, except for arsenic, were within the expected background range for this location. Because no arsenic contamination was identified in the soil or in groundwater from the nearby monitoring wells at the FT-1 site, its presence in the groundwater at this location is thought to be a localized phenomenon. The organics detected in the groundwater were all within drinking water standards except for benzene. Although the benzene levels in the groundwater exceeded the drinking water standard Maximum Contaminant Level (MCL), dispersion modeling projections showed that benzene levels would be well below the MCL at the nearest hypothetical receptor location. This site was determined to be nonhazardous and to have a low potential for constituent migration; therefore, no further action is required.

**FT-1 Fire Training Site 1.** FT-1 was used from the early 1940s until 1964 as a fire training area. Waste oils and sludges were mixed with JP-4, placed in a tank inside a bermed area, and ignited; protein foams were used to extinguish the fires. This site has been inactive since 1964. An analysis of the soils at the site indicated elevated levels of copper, lead, and zinc in the near surface soils only; their presence is expected since waste oils and sludges were applied to the site. The detected metals were present in concentrations that are considered to be within the background range at this location. No impact to public health is anticipated from this site, and no further action is recommended.

**SP-3 Underground JP-4 Line Leak.** During 1977 and 1978, an underground JP-4 line leak occurred near the Base Golf Course Club House. RIs indicated that the majority of the JP-4 seeped into the nearby ditch or was recovered from the site.

Sample analysis in 1985 identified no clear patterns of contamination, although the oil and grease concentrations appeared to be highest in the failed pipeline area. Groundwater samples indicated benzene levels at 2,350 micrograms per liter ( $\mu\text{g/l}$ ) and oil and grease levels that were slightly higher than background ranges.

To determine the extent of constituent contamination and the potential for offsite migration, this site was monitored from August 1987 through July 1988. Monitoring included a soil gas survey and the installation of three monitoring wells. An analysis of the chemical constituents detected in the background monitoring well indicated that the extent of site contamination could be greater than anticipated. Because these results were inconclusive, further monitoring methods were established in September 1988 (four borings, nine monitoring wells, and two piezometers); naphthalene and 2-methylnaphthalene and JP-4 were detected.

The site contains no known open exposure points to chemical concentrations that are above applicable or relevant and appropriate requirements (ARARs). However, it is recommended that a feasibility study be implemented to reduce, control, or eliminate potential health risks associated with possible future offsite migration of contaminants, exposure to chemicals during soils excavation in contaminated areas, and infiltration of contaminated groundwater into utility lines that transect the site.

**SP-4 Underground JP-4 Line Leak.** During 1977 and 1978, approximately 25 gallons of JP-4 fuel leaked as a result of a break in an underground line near the trailer park area. The contaminated soils were excavated and transported to the POL sludge weathering pit. No volatile organics were detected in the groundwater, and all groundwater in the area meets drinking water standards. The low levels of

organics detected may be attributed to roadway runoff or residual JP-4. No public health or environmental concerns are associated with this site, and no additional actions are recommended.

**SP-5 Underground JP-4 Line Leak.** In 1981, there was a break in a new JP-4 underground line near Building 2325 (east side of the base). Most of the contaminated soils were removed and taken to the POL Sludge Weathering Pit. Subsequent investigations did not find volatile organics or base/neutral extractable organics present above detection limit. Also, no constituents of concern were detected at this site. No public health or environmental concerns exist at this site; and no further action is recommended.

**SP-6 CE Storage Tank Spill.** An RI was initiated to further assess the effects of several suspected spill incidents that may have occurred near Building 2611. During the Phase II investigation soil sampling, oil and grease concentration levels averaged 13,000  $\mu\text{g/l}$  from two boreholes at the site. A groundwater sample from the site indicated oil and gas levels that were slightly higher than the background range, and toluene was detected at 26  $\mu\text{g/l}$ , which is below the EPA Primary Drinking Water Standard proposed maximum contaminant level (MCL) of 2,000  $\mu\text{g/l}$ . The Louisiana Department of Environmental Quality has approved a closure plan for this site, and, as outlined in the plan, the following steps will be taken. The tank and its contents, as well as any leakage into the ground, will be removed. Excavated soil will be disposed of in accordance with all applicable environmental laws and regulations. The tank will be cleaned and either reused or disposed of. All material used in the cleanup will be analyzed for hazardous components.

**SP-7 Motor Pool Underground Tank Leak.** In 1977, a 10,000-gallon UST in the motor pool was removed because of suspected leakage. At the same time, three other 10,000-gallon USTs were removed. Evidence of contamination was not present during the tank removal. In 1984, Phase II was initiated and the results from four hand-augured borings identified oil and grease concentrations at the detection limit to 7.9 percent. In addition, groundwater samples showed benzene, toluene, and ethylbenzene present at concentrations of 4,200  $\mu\text{g/l}$ , 8,600  $\mu\text{g/l}$ , and 3,900  $\mu\text{g/l}$ , respectively. The MCLs for these compounds are 5  $\mu\text{g/l}$ , 2,000  $\mu\text{g/l}$  (proposed), and 700  $\mu\text{g/l}$  (proposed), respectively. Oil and grease were within the background range in the groundwater.

When soil and groundwater samples from this site were analyzed for volatile organics, base/neutral extractable organics, and lead, fuel-type constituents were identified. A sample analysis also indicated the presence of nonpriority pollutant organics typical of fuel products. The presence of the nonpriority pollutant constituents is considered to be responsible for the level of background interference that limited identification and/or quantification for those constituents being sought in the analysis.

During the September 1988 investigation, three borings and five monitoring wells were installed. A soil sample analysis from the borings indicated the presence of ethylbenzene, benzene, toluene, and total xylenes. Gasoline constituents were detected in boring and groundwater samples at levels that exceeded the applicable MCL's. In addition, a thin film of hydrocarbons floating on saturated soil borings was also found at this site. It is recommended that additional monitoring wells be installed and that a feasibility study be initiated to determine the extent of subsurface contamination and the optimum remedial action.

**D-15 POL Sludge Weathering Pit.** This site was used from 1955 until 1982 to "weather" the waste oil and fuel sludge from POL tank cleanouts. When in use, the evaporation pit covered approximately 900 square feet and varied from 2 to 4 feet in depth. In 1982, the sludge weathering pit was covered with local soil and regraded to surface contours.

During the 1985 Stage I of the Phase II IRP Confirmation/Quantification (Radian Corporation), soil samples of site D-15 indicated heavy hydrocarbon contamination near the center of the pit and down slope of the pit area. Ground water samples identified a concentration of oil and grease that was significantly higher than background levels, as well as high levels of benzene and ethyl benzene. In addition, iridescent slicks were observed on the surface of the small drainage located adjacent the evaporation pit area.

The final Phase IV-A of the IRP for site D-15 (Walk, Haydel & Associates, Inc. 1990) Remedial Investigation Addendum Report, Volume 1, selected the no action alternative for the disposition of site D-15. Control measure technologies appropriate for site D-15 were investigated with respect to engineering feasibility, cost, and environmental and public health protection. The no action alternative was selected because:

- Site D-15 contains relatively low concentrations of volatile organics found below surface (deters surface runoff);
- Moderate to low soil permeability (deters constituent migration through soils); and
- The shallowest public supply aquifer in the England AFB area is approximately 400 feet subsurface (the shallow alluvial aquifer if used for industry and irrigation).

Projected exposure levels to D-15 site constituents were determined to be below levels of concern and no further action was required.

Table 3.3.2-5 presents a summary of investigative activities, contaminants, and recommendations for the IRP sites discussed above.

#### **3.3.2.4 Asbestos**

Currently, an asbestos survey on the base is approximately 65 percent complete. The expected completion date for the survey is September 1990.

#### **3.3.2.5 Polychlorinated Biphenyls**

All PCB-containing transformers on England AFB have been removed or flushed so that the equipment contains less the 50 ppm PCBs (the level considered PCB-contaminated). All new contract specifications bar equipment that contains PCBs.

#### **3.3.2.6 Radon**

The RAMP Initial Screening Survey was conducted in late 1988 and early 1989. The results revealed a low probability for the existence of elevated indoor radon levels. The low probability category is assigned to installations where none of the structures sampled are statistically found to have radon concentrations greater than 4 pCi/l. The highest recorded value was 2.8 pCi/l at the base. No further action is required in regard to radon testing or mitigation at England AFB.

#### **3.3.2.7 Radioactive Waste**

One confirmed low-level radioactive burial site is located on the north end of the base. The radioactive wastes are luminous markers from aircraft cockpits and some non-radioactive fluorescent

Table 3.3.2-5

**Remedial Investigation Summary - Final Reports  
Phase II IRP Sites - England AFB**

Site	Site Name	Potential Contaminants	Recommended Actions	Results
FTDS-1 (FT-1)	Fire Training/Drum Storage Site 1	Waste oils & sludges JP-4	Down gradient soil borings Boring grab water samples	Although benzene levels in groundwater exceeded drinking water standard MCL, the site is remote and potential risk to receptors is low. Site was determined nonhazardous; no further action is required.
SP-3	Underground JP-4 Line Leak	JP-4	Down gradient monitor wells Soils gas survey Soil borings	Both benzene levels and concentrations of oil and grease were somewhat higher than background levels. At present, site contains no known open exposure points to chemical concentrations that exceed acceptable limits, but it is recommended that a feasibility study be implemented to assess and/or deal with possible future contaminate migration and/or exposure.
SP-4 and SP-5	Underground JP-4 Line Leaks	JP-4	Soil boring	The contaminated soils were excavated and transported to the POL Sludge Weathering Pit. No public health or environmental concerns were associated with this site.
SP-6	CE Tank Spill	Waste oils	Down gradient monitor well Soil borings	Most contaminants appeared to be retained in the soils and the site closure plan has been approved by the Louisiana Department of Environmental Quality. The tank, its contents, and affected soils will be removed and disposed of in accordance with all applicable environmental laws and regulations.
SP-7	Motor Pool UST Tank Leak	MOGAS	Down gradient monitor wells Soil borings	Contaminants found at this site: ethylbenzene, benzene, toluene, and total xylenes. Gasoline constituents exceeded the standard drinking water levels. Initiate a feasibility study and install additional monitoring wells.
D-15	POL Sludge Weathering Pit	Sludge from POL tanks excavated soils with JP-4	Down gradient monitor wells	Soil characteristics are within regulatory provision/requirements, as are groundwater characteristics. The no action alternative has been selected.

tubes. The confirmed site is enclosed by a fence and is covered by grass to prevent erosion. A field survey revealed no detectable levels of radiation at the ground surface.

#### **3.3.2.8            Ordnance**

Various types of weapons and ammunition are stored in munitions bunkers south of the abandoned sewage lagoon. The total net explosive weight of the ordnance stored in the five munitions bunkers is 241,803 pounds. With the exception of 30 millimeter ammunition for the A-10, ordnance is infrequently carried on military aircraft operating into and out of the base. England AFB does not store weapons or ammunition for any other federal or local government agency.

#### **3.3.3                Natural Environment**

##### **3.3.3.1            Geology and Soils**

**Geology.** England AFB is located in Rapides Parish in the West Gulf Coastal Plain Province portion of Central Louisiana. The study area is in the transitional boundary between two distinct and contrasting topographies: the inner zone, which is characterized by the East Texas Timber Belt, and the Coastal deltaic plains, which is characterized by the Pine Flats Belt. The general direction of the dip of sediments in the West Gulf Coastal Plain is south-southeast, which thicken toward the Gulf.

Geologic units in the study region consist of the Red River alluviums, which are underlain by unconsolidated Miocene clays, silts, sands, and gravels, and Cretaceous clays, silts, sands, gravels, marls, shales, and sandstones. The Miocene deposits have interbedded lenses of consolidated materials (usually shales). Miocene sediment thicknesses range from 500 feet in the northwest portion of Rapides Parish to 5,300 feet in the parish's southeast corner.

The major structural features of the area are normal faults that presumably are related to sediment loading and associated subsidence. Two north-trending faults of Miocene sediments have been mapped through the Alexandria area (approximately 2 to 3 miles east of the base), and north and south of the installation, salt dome intrusion has caused local faulting and structural deformation of the Miocene sediments. England AFB is located in a zone of low seismic risk.

**Soils.** At England AFB, the most prevalent soils are the Norwood Series, which are located on the southern two-thirds of the installation. They are well-drained, moderately permeable, loamy soils that formed in the natural levee sediments on the alluvial plain of the Red River. Both the Norwood silt loam and the Norwood silty clay loam are soils with high natural fertility and moderate to poor engineering properties. The Norwood soils have a low shrink-swell potential, a moderate-to-low strength, and a susceptibility to piping (erosion by percolating water in a layer of subsoil that results in the formation of narrow conduits, tunnels, or "pipes"), which can lead to caving.

The northern portion of the base is on the Moreland clay (zero to 1% slope) soil of the Moreland Series. This soil is characterized by somewhat poorly drained, clayey subsoils that formed in the clayey sediments deposited on the alluvial plain of the Red River. Typically, they are fine-grained and have low permeability and poor internal drainage. The water table is seasonally high (1 to 3 feet from December through April), and the soils are susceptible to dessication cracking during dry periods. In general, soils of the Moreland Series have severe development restriction based on the engineering property ratings of high shrink-swell potential, moderate compressibility, low strength, and slow percolation.

### 3.3.3.2 Water Resources

**Groundwater.** Two major sources of groundwater are present in the Alexandria/England AFB region; the Red River alluvium (shallow source, unconfined aquifer) and the unconsolidated sands and gravels of Miocene deposits (deep source, confined aquifer). Onbase, the water table of the alluvial aquifer averages 10 feet, and the general flow direction within the aquifer is northeast, toward the Red River. Except for periods when the river is at flood stage, the alluvial aquifer discharges to the Red River as base flow. While wells in the shallow, quaternary alluvium aquifer may yield up to 1,700 gallons per minute, the excessive hardness and iron content make this an unsuitable water source for most domestic, municipal, and industrial consumers.

The Alexandria Municipal Well System supplies water to England AFB. In the Alexandria/England AFB region, three deep aquifers in the Miocene sands are widely used as water supplies. These sands are typically encountered at 400, 700, and 1,000 feet subsurface and are separated by interbedded clay or shale zones. These aquifers were originally considered to be confined, and most discharge from them was directed upward into the overlying alluvial aquifer by artesian pressures. Since concentrated pumping (wellfield development) at Alexandria has resulted in reduced artesian pressure in the Miocene aquifers, the regional upward discharge has been disrupted, and in some instances, flow directions between the shallow and deep aquifers have been reversed. The pumping-induced hydraulic connection between the shallow alluvial aquifer and the deep aquifers of the Miocene sands indicates that the overlying alluvial aquifer is now, in some locations, recharging the Miocene aquifers. Prior to this pumping-induced recharge to these deep aquifers, their recharge occurred either from precipitation on bedrock exposed in the northwest corner of Rapides Parish or from the highland Pleistocene deposits north and west of Alexandria.

Flow in the Miocene sands has been directed toward the cone of depression caused by the concentrated pumpage at the Bayou Rapides wellfield just north of the base, and natural discharge areas have been reduced in size.

**Surface Water.** The Big Bayou and Bayou Rapides provide the principal drainage for the base. These two streams were former channels of the Red River, which lies to the north, but are now inactive and separated by the natural levees of the Red River. Figure 3.3.3-1 presents the base surface water features and drainage patterns. Drainage originating in the northern, northeastern, and western portions of England AFB enters Big Bayou to the north via small drainage ditches and direct runoff. The southern and southeastern parts of the base are also drained by small ditches that flow south into Bayou Rapides.

The Louisiana Department of Environmental Quality has the primary regulatory responsibility for maintaining water quality within the state, assigning stream classifications for all state waters, and adopting applicable standards for these waters. Big Bayou and Bayou Rapides are designated as general use waters, suitable for aquatic life habitat, agricultural or industrial water supply, and recreation.

Currently, no surface water discharges are governed by NPDES permits; however, quarterly water quality monitoring is performed to ensure that the surrounding waterways meet state water quality standards and keep environmental impacts to a minimum. Six sample sites are routinely monitored on the base. Sample Site 1 is just upstream of the facility boundary on Big Bayou. Sample Site 2 is a drainage ditch that drains the northeastern section of the base and flows north into Big Bayou. Sample Site 3 is located at the point where Big Bayou exits the facility boundary, to the northeast. Sample Site 4 is in the southwestern corner of the base on the upstream section of Bayou Rapides.



Sample Site 5 is the golf course drainage ditch to the southeast, and samples from Sample Site 6 are taken at the eastern boundary of the base on the downstream section of Bayou Rapides. Water quality for Big Bayou and Bayou Rapides is fair to good; however, on several occasions, some criteria standards were exceeded in the streams and the drainage ditches. Total dissolved solids (TDS) and dissolved oxygen (DO) were the criteria that were exceeded most frequently.

Portions of the base are within the 100-year floodplains of Big Bayou and Bayou Rapides. The floodplains of these two streams border the northern and southern portions of the base. The 100-year floodplain boundary is shown in Figure 3.3.3-1.

### **3.3.3.3 Air Quality**

The England AFB area currently experiences good air quality because of relatively few sources of air pollutants and good atmospheric dispersion of air pollutants. The Louisiana state AAQS are the same as the national standards as presented in Table 3.2.3-1. An area in which existing air quality is better than the applicable ambient air quality standard is referred to as being in attainment for the pollutant. If ambient air quality standards are exceeded, the area is defined as nonattainment for each pollutant occurring at concentrations exceeding the applicable standard.

**Existing Regional Air Quality.** England AFB is within the Southern Louisiana-Southeast Texas Interstate Air Quality Control Region (AQCR No. 106). The base and the cities of Alexandria and Pineville are in attainment for all criteria pollutants. Only total suspended particulates (TSP) have been monitored in Rapides Parish because of the minimal number of either point or area sources. The TSP measurements were made in Alexandria, at a site about 4 miles from the base. A summary of the TSP concentrations measured in 1986, 1987, and 1988 is presented in Table 3.3.3-1. The maximum 24-hour average and annual geometric mean concentrations are well below the former ambient TSP standard concentrations (see Table 3.2.3-1). These measurements are indicative of the good air quality that exists in the Rapides Parish and in the vicinity of England AFB.

**Air Pollutant Emissions.** A summary of pollutant emissions from England AFB stationary and mobile sources is presented in Table 3.3.3-2. As shown in the table, aircraft flying operations and motor vehicles account for most of the base related CO and NO<sub>x</sub> emissions (89.7% and 81.5%, respectively). Aircraft operations are the principal source of HC and SO<sub>x</sub> emissions (41.1% and 45.9%, respectively). Firefighting, aircraft flying, and motor vehicles are equal contributors to particulate emissions, accounting for 94.0 percent of the total particulate emissions.

The latest regional air pollutant emissions inventory for Rapides Parish, Louisiana, extracted from the EPA National Emission Data System is provided in Table 3.3.3-3. The pollutants summarized include particulates, SO<sub>x</sub>, NO<sub>x</sub>, HC, and CO. The emissions data in the table include all significant sources, including fuel combustion, industrial processes, solid waste disposal, transportation, and miscellaneous. Based on the air pollutant emissions inventory, CO and HC emissions derive primarily from transportation-related sources. The coal burning for electric generation is responsible for most of the SO<sub>x</sub> and NO<sub>x</sub> emissions while traffic on unpaved roads produces most of the particulate emissions.

A comparison of pollutant emissions from England AFB with those from Rapides Parish indicates the base generates from 0.07 to 3.1 percent of the parish pollution burden for the principal pollutants. Overall, the base produces about 1 percent of the total parish pollution burden.

Table 3.3.3-1

**Maximum Total Suspended Particulate Concentrations ( $\mu\text{g}/\text{m}^3$ )  
Measured in Alexandria Louisiana**

<b>Year</b>	<b>First High (24 Hr. Avg.)</b>	<b>Second High (24 Hr. Avg.)</b>	<b>Annual Geometric Mean</b>
1985	95	82	39
1986	85	83	42
1987	100	86	41
1988	77	73	39

Source: State of Louisiana Ambient Air Quality Data Annual Report 1988.

Table 3.3.3-2

**Air Pollutant Emissions, England AFB, 1989  
(tons per year)**

<b>Emission Source</b>	<b>Particulates</b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>HC</b>	<b>CO</b>
Incinerators	0.011	.006	.004	0	0
Firefighting	7.879	0.25	0.256	28.492	34.471
Heating & Power Production	.075	4.140	.524	.067	.176
Surface Coating	0.0	0.0	0.0	10.979	0.0
Aerospace Ground Equipment	1.233	0.690	5.524	8.018	8.546
Fuel Evaporation Losses	0.0	0.0	0.0	59.247	0.0
Aircraft Flying Operations	6.437	6.847	26.775	115.892	374.933
Aircraft Ground Operations	0.089	0.607	12.117	9.170	33.336
Motor Vehicles	7.541	2.615	44.241	49.855	289.743
<b>TOTAL</b>	<b>23.265</b>	<b>14.930</b>	<b>99.441</b>	<b>281.721</b>	<b>741.205</b>

Source: Air Pollutant Emissions Inventory, England AFB 1989.

**Table 3.3.3-3**

**Rapides Parish, Louisiana Air Pollutant Emissions Inventory, 1988  
(tons per year)**

<b>Emission Source</b>	<b>Particulates</b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>HC</b>	<b>CO</b>
Fuel Combustion	1,124	19,664	40,405	1,158	3,691
Industrial Process	800	1,027	231	0	17
Solid Waste Disposal	164	6	35	268	837
Transportation	3,046	581	6,433	4,888	24,294
Miscellaneous	10,809	1	36	2,491	1,405
England AFB (Percent of Total)	23 (0.14)	15 (0.07)	99 (0.21)	282 (3.1)	741 (2.4)
<b>TOTAL:</b>	<b>15,966</b>	<b>21,294</b>	<b>47,239</b>	<b>9,087</b>	<b>30,985</b>

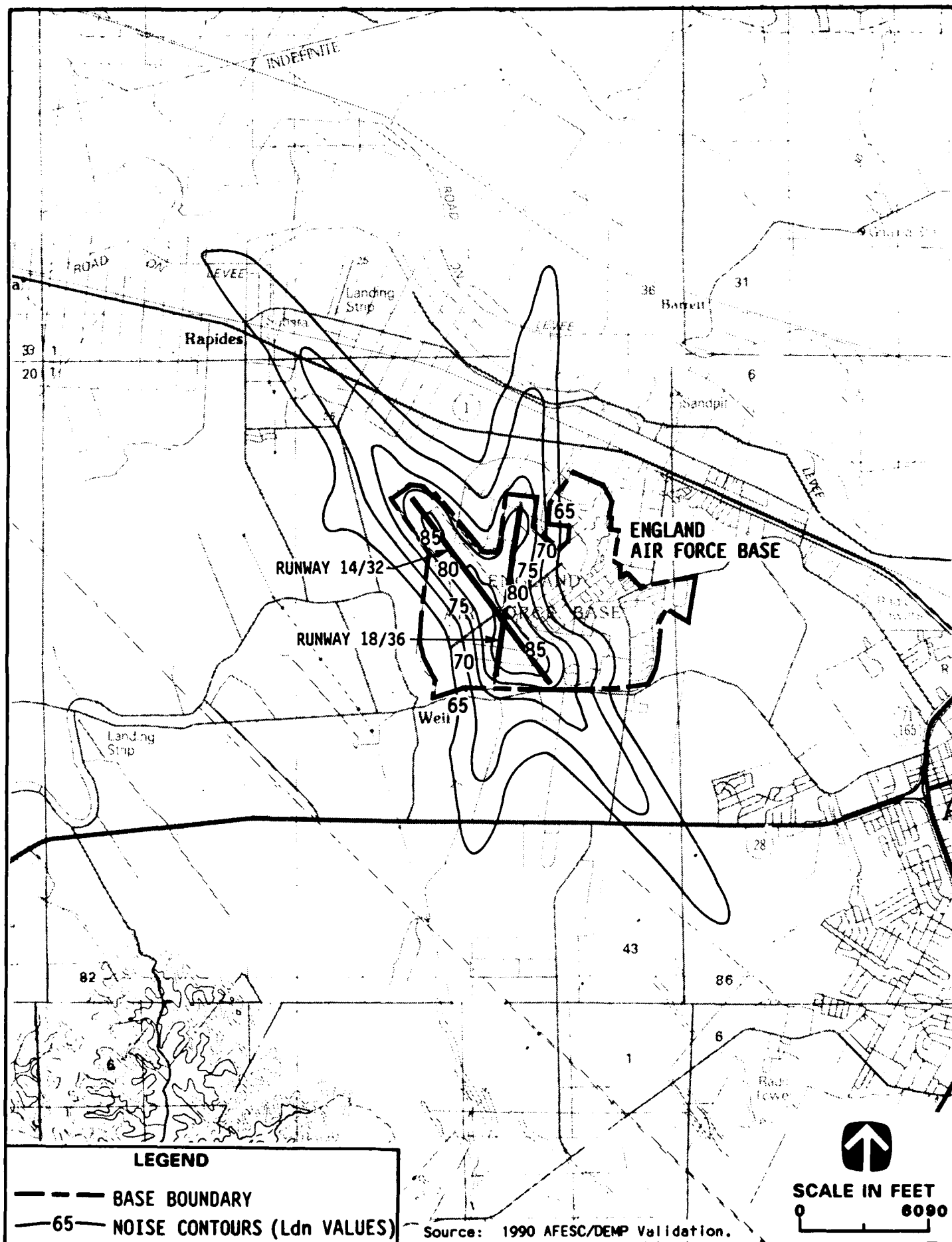
Source: Environmental Protection Agency 1988.

**3.3.3.4 Noise**

Aircraft operations on England AFB are the principal source of noise in the vicinity of the base. In order to minimize noise level impacts, England AFB aircraft operations are limited to the period from 7:00 A.M. to 10:00 P.M. Most of the aircraft traffic (93%) occurs between 7:30 A.M. and 5:30 P.M., Monday through Friday, while the remaining 7 percent involves necessary night, weekend navigation, and functional check flights.

The existing noise levels at England AFB were determined in February 1990 by the Air Force Engineering and Service Center, the base Environmental Protection Committee, and base operations and maintenance personnel to validate those contained in the current AICUZ (1983). This analysis used the NOISEMAP model to estimate L<sub>dn</sub> noise levels, which are 24-hour weighted average noise levels, as described in Section 3.1.3.4. Input to the model included information on aircraft engine noise levels, operations and performance characteristics, and maintenance support information. The resulting L<sub>dn</sub> noise contours are shown in Figure 3.3.3-2. The axes of the contours are located along the two runways (18/36 and 14/32). L<sub>dn</sub> noise levels of 85 dB occur along the 14/32 runway. Sensitive receptors northwest of the 14/32 runway include residences, a school, and a church. These receptors are subjected to noise levels of L<sub>dn</sub> 65 to 75 dB. An estimated 100 acres of offbase residential area, in which approximately 120 persons reside, are exposed to noise levels of L<sub>dn</sub> 65 to 70 dB. An additional 60 acres, in which approximately 40 persons reside, are exposed to noise levels of L<sub>dn</sub> 70 to 75 dB.

A secondary noise source in the vicinity of England AFB is vehicular traffic on Louisiana Highways 1 and 28. Although noise measurements have not been made along these highways, the Federal Highway Administration noise model STAMINA 2.0 was used to estimate the L<sub>dn</sub> noise levels 100 feet from the highway along segments in the vicinity of the base. Traffic volumes were used to calculate



the noise levels. The  $L_{dn}$  value along Highway 1 was about 59 dB while along Highway 28 it was about 57 dB.

### 3.3.3.5 Biological Resources

**Vegetation.** The vegetation onbase has been strongly influenced by man in accordance with the base mission and supportive development. Only a small portion of the base supports native vegetation. Improved grounds, including well-maintained lawns in residential and base operation areas and the golf course, cover approximately 527 acres of the base (excluding buildings and pavement, which cover an additional 518 acres). These grounds are dominated by grasses, mostly St. Augustine (*Stenotaphrum secundatum*), with a variety of native and ornamental trees and shrubs. Live oak (*Quercus virginiana*) is the primary tree species in the residential areas, particularly near the older residences and streets. Many of these trees were apparently planted when the base was opened in 1940. A variety of other species are also present in this area, including sycamore (*Matanus occidentalis*), cottonwood (*Populus deltoides*), and magnolia (*Magnolia* sp.). Various smaller trees, such as redbud (*Cerios canadensis*) and mimosa (*Albissia julibrissia*), are used as accent trees. Fertilizers are applied regularly to lawns, trees, and shrubs, and pesticides are used on an as needed basis to control insects and fungi. All pesticides are applied according to EPA and Louisiana Department of Wildlife and Fisheries standards to reduce the risk of pollution.

Semi-improved areas total 1,463 acres, and include 669 acres that are mowed regularly under service contract and 794 acres that are leased for hay production. These areas occur around taxiways, aprons and runways munitions areas, and recreation areas such as picnic areas and horse stables. These areas are also mowed regularly, although less frequently than improved areas. Areas immediately adjacent to runways are maintained at a low height to reduce utilization by birds in accordance with the base's bird aircraft safety hazard plan. The remaining 96 acres of the base are considered unimproved and include water bodies and adjacent vegetation and a few other unmanaged areas.

Although the base has no forest per se, wooded areas are adjacent to various water bodies onbase. Wooded areas are adjacent the Golf Course Slough, also called LeTig Bayou, along portions of the Bayou Rapides, along the western base boundary, and along the old sewage oxidation pond. Prominent tree species in these areas include live oak, cottonwood, sweet pecan (*Carya illinoensis*), sycamore, water oak (*Quecus nigra*), American elm (*Ulmus americana*), and green ash (*Fraximus pennsylvania*). Shrubby vegetation, primarily buttonbush (*Cephalanthus accidentalis*), forms a dense heath in the Golf Course Slough.

**Wildlife.** The Fish and Wildlife Management Plan for England AFB (1985) contains an extensive list of vertebrate species known to occur onbase. The list includes 135 bird species, 30 mammals, 8 lizards and skinks, 28 snakes, 12 turtles, 10 salamanders, and 13 toads and frogs. The bird and mammal fauna are diverse because of their variable tolerance for human activities and their use of human-influenced habitats.

Predictably, the most abundant birds onbase are those that use grassland and urban habitats. Abundant urban species include bluejay (*Cyanocitta cristata*), cardinal (*Cardinalis cardinalis*), purple martin (*Progne subis*), rock dove (*Columba livia*), and mourning dove (*Zenaida macroura*). Abundant grassland birds include American kestrel (*Falco sparverius*), eastern kingbird (*Tyrannus tyrannus*), dickcissel (*Spiza americana*), and eastern meadowlark (*Sturnella magna*). Birds that use woodlands and wetlands also occur onbase but are less abundant. Such species include woodpeckers, prothonotary warbler (*Prothonotaria citrea*), yellow breasted chat (*Icteria virens*), belted kingfisher (*Ceryle alcyon*), and little-blue heron (*Egretta caerulea*).

As with the birds, the mammals onbase favor certain habitats. In residential areas, the most common mammals are scavengers, such as the opossum (*Didelphis virginiana*), roof rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*), and raccoon (*Procyon lotor*). Throughout the hay cropping area, the most common species are eastern cottontail (*Sylvilagus floridanus*), eastern mole (*Scalopus aquaticus*), and striped skunk (*Mephitis mephitis*). Other common mammals onbase occur near the waterways, especially Bayou Rapides and the Golf Course Slough. These species include the gray and fox squirrels (*Sciurus carolinensis* and *S. niger*), American beaver (*Castor canadensis*), march rice rat (*Oryzomys palustris*), and evening bat (*Nycticeius humeralis*).

Most of the reptiles and amphibians are associated with the waterways, although several, such as certain toads, snakes, and lizards, will use other portions of the base.

Fish habitat on the base is considered quite poor. Elevated turbidity and pollutant levels in the Big Bayou and Bayou Rapides, mostly due to adjacent agriculture, limit the fish fauna in these streams. The Golf Course Slough supports a substantial amount of aquatic vegetation, particularly buttonbush, which also lowers its utility as a fish habitat. Fish found onbase include minnows, shiners, and sunfish. No habitat for sport fishing occurs onbase.

**Wetlands.** To date, no detailed delineation studies of wetlands have been conducted on the base. Wetlands are technically identified and delineated based upon the federal "three-parameter" methodology, which requires that an area support hydrophytic vegetation (under normal circumstances), have hydric soil, and have indicators of annual saturation or ponding (wetland hydrology) in order to be classified as a wetland (Federal Interagency Committee for Wetland Delineation, 1989). For exact delineation of wetland boundaries, these three parameters must be evaluated in the field by vegetation and soil sampling and analysis of hydrologic indicators. Although there has been no field delineation study, an estimation of the wetlands on the base can be inferred from the county soil survey, which delineates larger areas of soil types that are classified as hydric; topographic maps; National Wetlands Inventory (NWI) maps, and written descriptions of vegetation.

No hydric or wetland soils have been mapped on base as shown in the Rapides Parish soil survey (SCS 1980), thereby indicating no widespread wetlands. In addition, the dominant grassland (lawns, golf course, hay cropping area) is generally dependent upon adequate drainage. However, some wetlands do occur onbase along the Golf Course Slough. This area supports dense growths of buttonbush, a species that virtually always occurs in wetlands. The estimated size of the slough is 18.6 acres. Additionally, most of the trees and shrubs which occur onbase, including deciduous holly (*Ilex decidua*), water oak, and black willow (*Salix nigra*), also very rarely occur outside wetlands. Thus, the wooded area along the Golf Course Slough, as well as other wooded areas onbase (all of which are associated with streams or water bodies), may also be, wholly or in part, federal jurisdictional wetlands.

**Threatened and Endangered Species.** No plant or animal species listed as threatened, endangered or sensitive by the USFWS occur on the base. One plant listed as sensitive (i.e., under review for status as threatened or endangered), the smooth magnolia-vine (*Schisandra glabra*), occurs in Rapides Parish but not on the base. Within a 50-mile radius, two additional sensitive plants may occur--the prairie white-fringed orchid (*Platanthera leucophaea*) and Oglethorpe's oak (*Quercus oglethorpensis*) (Table 3.3.3-4).

Two listed animals are known to occur within a 50-mile radius of the base - the endangered red-cockaded woodpecker (*Picoides borealis*) and the threatened American alligator (*Alligator mississippiensis*). Two additional endangered species, the peregrine falcon (*Falco peregrinus*) and

Table 3.3.3-4

Sensitive, Threatened, and Endangered Species  
That Occur or May Occur Within a 50-Mile  
Radius of England AFB

Scientific Name	Common Name	Status			Occurrence
		Federal	State		
<i>Schisandra glabra</i>	Magnolia vine	S	None		Confirmed within 50-mile radius of England AFB.
<i>Platanthera leucophaea</i>	Prairie white-fringed orchid	S	None		Possible, based on habitat available, species range, and historical sitings.
<i>Quercus oglethorpensis</i>	Oglethorpe's oak	S	None		Possible, based on habitat available, species range, and historical sitings.
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	E		Confirmed within 50-mile radius of England AFB.
<i>Alligator mississippiensis</i>	American alligator	T	E, T		Confirmed within 50-mile radius of England AFB.
<i>Falco peregrinus</i>	Peregrine falcon	E	E		Possible, based on habitat available, species range, and historical sitings.
<i>Haliaeetus leucocephalus</i>	Bald eagle	E	E		Possible, based on habitat available, species range, and historical sitings.

Source: Noble 1986.

bald eagle (*Haliaeetus leucocephalus*), may occur as transients within 50 miles of the base, particularly near Toledo Bend Reservoir, which is approximately 55 miles west of the base.

#### **3.3.3.6 Cultural and Paleontological Resources**

**Prehistoric Resources.** England AFB lies in the Red River Valley, which contains a variety of prehistoric site types ranging from Paleoindian sites to Historic Caddo occupations. Site types include elaborate population/ceremonial centers, burial mounds, villages, hamlets, and camps. The majority of sites in the area represent the Tchefuncte, Marksville, Troyville/Coles Creek manifestations of the Woodland period.

In 1987, a windshield reconnaissance study of England AFB was conducted by the National Park Service. Because of extensive ground modification during base construction, no undisturbed archaeological sites were anticipated. The Louisiana State Historic Preservation Officer (SHPO) concurred that no sites eligible for the National Register of Historic Places (NRHP) occur at England AFB (August 12, 1987).

Native American groups associated with this area include the Caddo, Choctaw, and Chickasaw. The Caddo consisted of at least 25 identifiable groups loosely combined into 3 confederacies. The Natchitoches groups occupied central Louisiana, including the area around Alexandria. Currently, the Caddo are formally organized as the Caddo Indian Tribe of Oklahoma. The Choctaw are the most widely dispersed Indian group presently residing in Louisiana. The largest Choctaw groups are descendants of settlements established in the state during the 18th century. The Jena Band, in LaSalle Parish, is the most traditional of the contemporary Choctaw groups in Louisiana.

**Historic Resources.** In 1987, a historic standing structures survey was completed for England AFB. No standing structures were considered NRHP eligible.

**Paleontological Resources.** The surficial geology of England AFB consists of a moderately thick section of Holocene alluvium of the Red River Valley. The alluvial deposits of clay, silt, sand, and gravel are poorly sorted and fine and attain a maximum thickness of approximately 120 feet in the vicinity of the base. The alluvial unit overlies a thick sequence of primarily unconsolidated Miocene sediments with some shales. These Miocene deposits range in thickness from approximately 500 feet in the northwest portion of the parish to 5,200 feet the southeast. In the vicinity of England AFB, Miocene deposits are exposed only in deeply cut stream valleys. The two Miocene formations, the Fleming and Catahoula, are not considered fossiliferous. The modern alluvium which characterizes England AFB geology is probably less than 2,000 years old. Because of its young age and mode of deposition, the alluvium probably does not contain any scientifically important paleontological materials.

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## **4.0**

## **ENVIRONMENTAL IMPACTS**

The focus of the discussion in this chapter is the potential environmental impacts of base closure. To provide the context in which impacts to the environment may occur, discussions of potential changes to local population, land use and aesthetics, transportation, and community utility services are included. The socioeconomic impacts of those changes are discussed only to the extent that they cause impacts to the natural environment. In addition, issues related to current and future management of hazardous materials/waste are discussed. Potential impacts to the natural environment are evaluated for geology and soils, water resources, air quality, noise, biological resources, and cultural and paleontological resources. These impacts may occur as a direct result of base closure or as an indirect result of changes to the community or changes in handling of hazardous materials/waste. Potential mitigation measures for all adverse environmental impacts are discussed following the resource sections. In addition, the relationship between short-term uses and long-term productivity of the environment and irreversible and irretrievable commitment of resources are discussed.

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## **4.1 MYRTLE BEACH AIR FORCE BASE, SOUTH CAROLINA**

### **4.1.1 Local Community**

The Air Force is sensitive to the adverse effects on the community that may be caused by closing a major employer like Myrtle Beach Air Force Base (AFB). Therefore, the Air Force has advised the local communities that planning assistance is available from the Office of Economic Adjustment (OEA) upon their request. The OEA, located in the Office of the Assistant Secretary of Defense, is the chief staff arm for the President's Economic Adjustment Committee (EAC). The EAC consists of federal department and agency heads and was established under Executive Order 12049 on March 27, 1978, to provide resources to various federal agencies in assisting communities affected by base closures. One of the OEA's activities is to assist support communities in the development and implementation of comprehensive economic recovery programs. The EAC then affords priority assistance to community requests for federal technical assistance, financial resources, excess or surplus property, or other requirements that are part of this program.

#### **4.1.1.1 Community Setting**

The potential socioeconomic effects of the closure of Myrtle Beach AFB on the City of Myrtle Beach and Horry County were evaluated on the basis of projected changes in area employment and population. The direct economic effects of closure involve decreases in military and civilian employment and income on the base, as well as reductions in Air Force procurement of goods and services from the region. The indirect effects of closure were estimated through the application of the Economic Impact Forecast System (EIFS), Version 4.0, developed by the U.S. Army Corps of Engineers. EIFS estimates the "multiplier" between direct and indirect effects on the basis of current data describing the types and size of local industries and businesses in the county. Potential out-migration was estimated by applying appropriate demographic characteristics to the projected reductions in direct and indirect employment.

The closure of Myrtle Beach AFB would reduce employment in the local area by nearly 5,420 jobs including 3,950 military and civilian jobs onbase and about 1,470 secondary jobs. This analysis was based on projected manpower authorizations for the quarter prior to initiation of base closure. This reduction in employment would result in a decrease in personal income of about \$105 million annually and a decrease in local spending (including personal consumption expenditures and base procurement) of about \$116 million annually.

All military employees would be relocated, and it is projected that approximately 80 percent of direct and 50 percent of secondary civilian employees would also relocate to other areas. It is also expected that up to 25 percent of local military retirees would relocate closer to other active installations. Total population outmigration is projected to be approximately 16,160 people when the base would be completely closed in 1993. This represents about 10 percent of the current population of Horry County.

These reductions in employment and population may result in other socioeconomic effects such as increases in the housing vacancy rate and the closure of certain public and commercial facilities. However, these socioeconomic consequences would not result in impacts to the biophysical environment and are not discussed in this document.

A separate Local Economic Consequences Study is being prepared by the Air Force which will address in greater detail the effects closure may have on such socioeconomic resources. The Air Force will consult with state and local officials during preparation of the Local Economic Consequences Study. Copies of the economic study will be made available to members of Congress, state and local officials, and state Single Points of Contact under Executive Order 12372 *Intergovernmental Review of Federal Programs*.

**Services to Jetport.** With closure, the base would no longer provide the following services to Myrtle Beach Jetport: air traffic control; runway and airfield maintenance; navigational aids; utilities; crash, fire, and rescue services; and installation security services. The Horry County Department of Airports or the Federal Aviation Administration (FAA) would be responsible for providing these services.

Closure of Myrtle Beach AFB may affect the issuance of the 1990 Airport Revenue Bond Issue and the Jetport's terminal expansion program the bond is intended to finance, because the Department of Airports may not be able to service the bond debt and provide the services discussed above. Cancellation of the terminal expansion program would avoid the resulting minor impacts to biological resources, air quality, and noise described in Section 2.5 (No Action Alternative).

#### **4.1.1.2 Land Use and Aesthetics**

**Land Use.** Closure of Myrtle Beach AFB would have no effect on land ownership because the Air Force would retain the property until an appropriate reuse has been determined. However, closure would affect the occupancy of mission-related facilities, housing, and community services onbase. Facilities would be vacated until the reuse of the property is determined, and until that time, a caretaker program would provide maintenance to prevent deterioration and retain a positive appearance. The closure is expected to have potentially beneficial impacts on surrounding land use because of reductions in both noise and potential aircraft accidents in areas near the base.

Figure 4.1.3-1 (Section 4.1.3.4) shows the reduced noise levels as a result of cessation of A-10 aircraft operations. (Noise levels from commercial aircraft operations at the Myrtle Beach Jetport would remain.) The offbase residential areas on either side of the north end of the runway would no longer lie within the 65 to 75 decibel (dB) noise levels. In addition, commercial lodging in the south Accident Potential Zone (APZ) 1 would no longer be incompatible with Air Force recommendations. With continued operation of the Myrtle Beach Jetport after base closure, FAA regulations regarding establishment of aircraft accident hazard zones and incompatible land uses would apply. The FAA Runway Protection Zone is similar to the Air Force Clear Zone in that it prohibits all land uses except transportation, communication, utilities, and agriculture. The Runway Protection Zone for the Myrtle Beach runway begins 200 feet beyond the end of the runway and is centered on the extended runway centerline. It is a trapezoidal area 2,500 feet long and 1,000 feet wide at the end nearest the runway and 1,750 feet wide at the far end (area of 79 acres). The recreational commercial development presently in the south Clear Zone would continue to be incompatible with the Runway Protection Zone. The FAA recognizes no equivalent to military APZs.

The City of Myrtle Beach and Horry County would be responsible for any amendments to land use plans or zoning ordinances that may be made possible by base closure.

**Aesthetics.** No construction or demolition activities are planned as part of the proposed closure action. The installation would be under government control within a secured boundary. Buildings and grounds would be minimally maintained until final disposition is decided. Therefore, some change in aesthetic and visual resources is anticipated.

#### **4.1.1.3 Transportation**

**Transportation Systems.** Closure of Myrtle Beach AFB would have a primarily beneficial effect on transportation systems. Highway traffic in the vicinity of the base would be reduced after closure, and the cessation of military aircraft operations would reduce air traffic in the area. Railways would not be used for closure-related transport.

**Ground Traffic.** During the closure period, traffic would increase due to freight shipment of equipment, supplies, and materials from Myrtle Beach AFB to the receiving locations. It is estimated that 3,270 military and 680 civilian employees would relocate as a result of base closure. Each

employee represents a workstation that contains, on average, 3,000 pounds of equipment. Employee workstation equipment and supplies, therefore, represents 5,925 tons of materials that would be transported from Myrtle Beach AFB to receiving locations. Based on a truck capacity of 9 tons (18,000 pounds), approximately 658 truck-trips would be required to transport workstation equipment from Myrtle Beach AFB during the closure period.

Household goods would also be transported from Myrtle Beach AFB during the closure period. Based on 1,800 employees living onbase, a ratio of 65 percent accompanied and 35 percent unaccompanied employees, five rooms per accompanied employee and three rooms per unaccompanied employee, and 1,000 pounds per room, approximately 3,865 tons of household goods would be transported during the closure period. Assuming a truck capacity of 9 tons, approximately 430 truck trips would be required to transport household goods from Myrtle Beach AFB to the receiving locations.

Based on the above assumptions, a total of 1,088 truck-trips would be generated by the transport of workstation equipment and onbase household goods during the closure of Myrtle Beach AFB. Even if the transport of equipment and household goods was limited to 10 days each quarter over the 1-year closure period, only about 27 truck-trips per day would be added to the local roadway network. These additional vehicle trips would represent a very small increase to existing traffic volumes on the highways directly serving the base (U.S. 17 and U.S. 17 Business) and the other major arterials in the base vicinity (U.S. 501, and State Highways 707 and 544) (Table 3.1.1-1). In addition, these truck-trips could be scheduled to avoid morning and afternoon peak traffic times. Therefore, closure-related truck transport should have a minimal effect on traffic flow in the base vicinity.

Transport of household goods for base military and civilian employees living offbase who would leave the Myrtle Beach area would amount to approximately 4,300 tons and require 480 truck-trips over the 1-year drawdown period. Transport of household goods for persons leaving the area because of secondary economic effects would be distributed over a longer period. In addition, these persons would be leaving from locations dispersed throughout the Myrtle Beach area. Therefore, it is very unlikely that transport of these persons and household goods would generate enough truck traffic at the same time and place to affect local traffic flow.

Once the base is closed, the approximately 9,300 vehicles trips per day generated by the base would be removed from local roadways. Assuming a peak-hour factor of 10 percent, 930 peak-hour vehicle trips would be eliminated from U.S. 17 Business and U.S. 17. Based on a 60/40 Main Gate/North Gate split, 558 and 372 peak-hour vehicle trips would be eliminated from U.S. 17 Business and U.S. 17, respectively. While this reduction in traffic would not change the peak-hour level of service (LOS) on these roadways, the volume-to-capacity ratio would be reduced from 0.36 to 0.29 on U.S. 17 Business, and 0.47 to 0.42 on U.S. 17. Therefore, peak-hour traffic flows should be improved slightly on these roadways. Smaller reductions in peak-hour traffic flow would be expected on other major arterials in the vicinity of the base.

**Air Traffic.** Cessation of military aircraft operations from Myrtle Beach AFB would reduce air traffic in the region. Civilian traffic from the Jetport and the other two airports (Grand Strand and Conway) in the region would remain. As the present level of congestion is low, this is considered a minor improvement. Closure of the base would remove the existing limit on commercial flights. Because the present number of commercial flights to the Jetport (25-27 per day) is well below the limit set by the new Joint Use Agreement (46 per day), the absence of this restriction is not likely to substantially increase on the number of flights at the Jetport in the near future.

Closure of Myrtle Beach AFB would require transfer of air traffic control for the Jetport, and for the much larger area up to 10,000 feet mean sea level (MSL) (Section 3.1.1, Figure 3.1.1-6), to the FAA. The responsibility for approach and departure air traffic control into and out of the Jetport may have to be assumed by the Jetport itself. Scheduling responsibility for the Gamecock Military Operating

Areas (MOAs) would be transferred to another military installation in the region, with the exception of Gamecock C, which would be returned to the National Airspace System.

#### **4.1.1.4 Utilities**

**Water Supply.** Except for the 73rd Tactical Control Squadron (TCS), which receives its water supply from the City of Myrtle Beach, Myrtle Beach AFB supplies its own water needs through groundwater wells and does not use the local water supply provided by the Grand Strand Water and Sewer Authority (GSWSA) to the area surrounding the base. Closure of Myrtle Beach AFB would reduce base use of groundwater by approximately 190 million gallons per year; some usage would be required for caretaker activities.

Base closure would also result in the vacating of approximately 4,000 offbase units currently occupied by military or civilian employees of the base, or by persons expected to leave the area due to secondary economic effects, resulting in an additional reduction in water use. Assuming 70 percent of these persons live in the GSWSA's South Strand service area, this would result in an additional reduction in water use of approximately 360 million gallons per year, or approximately 21 percent of the water used in this service area yearly. The vacating of units in the City of Myrtle Beach (30% of outmigrants) would reduce use of water by an additional 150 million gallons per year, or approximately 5 percent of the water used in the city yearly.

**Wastewater Treatment.** The closure of Myrtle Beach AFB would result in the loss of approximately 16 percent of the annual average flow of wastewater treated at the GSWSA Schwartz Wastewater Treatment Plant. In addition, approximately 16 percent of the plant's annual average daily flow would be lost because of the vacating of offbase residences serviced by the GSWSA inhabited by either military or civilian employees of the base, or by persons expected to leave the area due to secondary economic effects (assuming 70% of these persons live in the GSWSA service area). The wastewater flow reduction is not likely to have an adverse effect on the capacity or operation of the Schwartz Wastewater Treatment Plant. However, longer detention times in GSWSA's collection system due to reduced flows could result in increased corrosion in wet wells and manholes (L. Schwarz, personal communication). This problem would be alleviated by adjustments to current operation and maintenance procedures.

An estimated 3,300 persons expected to leave the area are serviced by the Myrtle Beach Wastewater Treatment Plant. Loss of these customers would result in a reduction of approximately 0.35 million gallons per day (MGD) or 4 percent of the annual average flow treated at the plant. No direct adverse effect on the capacity or operation of the Myrtle Beach Wastewater Treatment Plant or hydraulic impacts on the collection and sewer systems is expected.

**Solid Waste.** Implementing base closure would result in a short-term increase in the amount of solid waste generated by the base from closure and removal activities and disposed of in the Horry County Landfill. This short-term increase, however, would be offset by the 8,181 cubic yards (approximately 4,000 tons) per month normally generated by the base after closure. This reduction in the waste from the base would extend the useful life of the landfill approximately 6 months at the present fill rate.

**Energy.** Base closure would result in a 5 percent decrease in the electric power supplied by the Santee Cooper Power Company to the service area that includes Horry and Georgetown counties, and cooperatives and major industries in the area. Offbase vacancies resulting from base closure would reduce electrical power usage in the service area by an additional estimated 8 percent. Electrical power would continue to be used to operate navigational aids and other aviation-related activities associated with the Myrtle Beach Jetport. Closure of Myrtle Beach AFB would not eliminate all power consumption since some electrical usage would be required for caretaker activities in the interim period until final disposition of the base is determined. The projected reduction in power use is not expected to affect Santee Cooper's ability to generate and distribute electrical power.

Closure of Myrtle Beach AFB would not result in an adverse effect on the base supplier of natural gas, South Carolina Electric and Gas Company. Base closure would result in a reduction of approximately 6 percent of the gas supplied by South Carolina Electric and Gas to the Horry County service area. Offbase vacancies resulting from base closure would reduce gas use in the service area by an additional estimated 9 percent.

#### **4.1.2 Hazardous Materials/Waste Management**

##### **4.1.2.1 Hazardous Materials Management**

With base closure, hazardous materials used and stored at the Base Supply Storage Area and at the various industrial facilities throughout the base would be shipped and used elsewhere or sold as excess in accordance with applicable federal and state regulations. Hazardous materials collected during the base closure process would be disposed of through the Myrtle Beach AFB Defense Reutilization and Marketing Office (DRMO), Building 526. A small amount of hazardous materials such as gasoline, oils, herbicides, and pesticides would continue to be stored and used onbase for maintenance of the base facilities during the caretaker period. A minor beneficial impact to public health, water resources, soils, and biological resources would result due to the inventory reduction and related reduced potential for spills, and limited use of hazardous materials on the base after closure.

***Aboveground and Underground Storage Tanks.*** Most of the aboveground storage tanks and associated piping at Myrtle Beach AFB would be drained and rendered temporarily out of service. Aboveground tanks necessary for maintenance of the base during caretaker activities would remain in service.

Closure of Myrtle Beach AFB would result in most of the base underground storage tanks (USTs) being taken temporarily out of operation, upgraded, or closed. The 24 regulated USTs onbase would be subject to special provisions. Regulated tanks taken out of service for more than 3 months but less than 12 months would be drained, but would continue to be subject to operating requirements under 40 CFR 280.31, and any release detection in accordance with Subpart D, South Carolina Underground Storage Tank Control Regulations (SCUSTCR) Section R.61-92.7, and the Underground Storage Tank Management Plan for Myrtle Beach AFB (May 1988). Tank vent lines would remain open and functioning; all other lines, pumps, manways, and ancillary equipment would be capped and secured.

Tanks taken out of service for more than 12 months must be permanently closed if they do not meet either performance standards in 40 CFR 280.20 for new UST systems or the upgrading requirements in CFR 280.21, except that the spill and overfill equipment requirements do not have to be met. Substandard UST systems (not meeting upgrading requirements) must be permanently closed at the end of the 12-month period in accordance with 40 CFR 280.71-280.74 unless the South Carolina Department of Health and Environmental Control (DHEC) provides an extension of the 12-month temporary closure period. Before an extension can be applied for, a site assessment in accordance with CFR 280.72 must be completed. Tanks permanently closed would have all regulated substances removed and filled completely with a clean inert solid material, or removed from the ground in accordance with 40 CFR 280.71(b). Underground tanks that have been permanently closed or placed temporarily out of operation would be reported to the South Carolina DHEC according to SCUSTCR Section R.61-92.7.H. All underground tanks scheduled for removal would be removed in accordance with the approved Underground Storage Tank Management Plan for Myrtle Beach AFB (May 1988) and SCUSTCR Section R.61-92.

The reduced use of the aboveground and underground storage tanks at Myrtle Beach AFB is expected to have a minor beneficial effect on the environment by reducing the potential for future spills or leaks to contaminate soil and water resources.

***Pesticides/Herbicides.*** Chemicals used to control pest infestations and ground foliage would be necessary for maintenance activities on the base during the caretaker period; however, the amount of pesticides

and herbicides stored and used during this period would be much smaller than that for normal operation of the base. Chemicals determined to be unnecessary for caretaker maintenance activities would be disposed of through the DRMO.

**Other Hazardous Materials.** All other hazardous materials, such as acids, compressed gases, and solvents, not needed for maintenance of the base until final disposition is determined would be shipped and used elsewhere or sold as excess in accordance with applicable federal and state regulations through the DRMO.

#### **4.1.2.2 Hazardous Waste Management**

Hazardous wastes collected during the base closure process would be disposed of through the Myrtle Beach AFB DRMO. All waste currently stored at Myrtle Beach AFB would be disposed of in accordance with applicable Resource Conservation and Recovery Act (RCRA) regulations. The two facilities at Myrtle Beach AFB that are classified as Treatment, Storage, and Disposal (TSD) facilities, Waste Fuels Storage Area (Facility #89008) and DRMO Storage Facility (#45203), would be closed according to the closure plans as specified in Attachment 4 of the Hazardous Waste Management Plan for Myrtle Beach AFB (January 1988). Attachment 4 briefly describes the facility conditions, procedures for removing all waste inventory and decontamination of the facility, completed closure certification to DHEC procedures, and the name and telephone number of the post-closure contact person. Minor beneficial impacts to public health, water resources, soils, and biological resources would result from the reduction of current hazardous waste disposal activities and potential spills.

#### **4.1.2.3 Installation Restoration Program Sites**

Activities to remediate past hazardous waste disposal sites identified in the Installation Restoration Program (IRP) would continue at Myrtle Beach AFB. IRP Remedial Investigation/Feasibility Studies and subsequent remedial action are independent of the base closure process and will continue until remediation is completed. Closure of the base would have little potential for adversely affecting remediation of hazardous waste sites under IRP.

#### **4.1.2.4 Asbestos**

A survey for asbestos-containing materials on Myrtle Beach AFB will be completed prior to base closure. Any asbestos found will be handled in accordance with the Air Force Policy on management of asbestos at bases for which the General Services Administration is the disposal agent (Appendix D.)

#### **4.1.2.5 Polychlorinated Biphenyls**

Transformers and equipment contaminated with at least 50 parts per million (ppm) PCBs are scheduled for replacement or for flushing the contaminated fluid until the PCB concentration is below 50 ppm by the end of fiscal year (FY) 1991. Therefore, no effect from base closure is expected.

#### **4.1.2.6 Radon**

The Initial Screening Survey Results of the Radon Assessment and Mitigation Program (RAMP) indicated radon concentrations less than 2 picoCuries per liter (pCi/l) for sampled Myrtle Beach AFB structures. Radon concentrations less than 4 pCi/l pose no significant health risk. Therefore, no effect from base closure is expected.

#### **4.1.2.7 Radioactive Waste**

No radioactive waste is stored on the base; therefore, no base closure effects are expected.

#### **4.1.2.8        Ordnance**

With base closure, all ordnance would be removed from the base in accordance with state and federal regulations, and the related potential hazards would be removed.

#### **4.1.3        Natural Environment**

##### **4.1.3.1        Geology and Soils**

**Geology.** Withdrawal of personnel, equipment, and supplies from Myrtle Beach AFB would have no effect on the geology of the area. Additionally, because the federal government would retain ownership and mineral rights until final disposition of the base, there would be no effect on the availability of mineral resources which may be deemed commercially valuable.

**Soils.** Closure of the base may have some positive impacts to base soils because there would not be any new construction of military facilities, and consequently, no grading, excavation, erosion, or other disturbance of topsoil. Any risk of new soil contamination created by spills or accidental release of hazardous materials caused by military operations would be reduced substantially. Soils that are currently contaminated with hazardous wastes would continue to be remediated under the IRP, as described in Section 4.1.2.

##### **4.1.3.2        Water Resources**

**Groundwater.** Closure of Myrtle Beach AFB and vacating of approximately 2,800 residences in the GSWSA's South Strand service area would reduce use of local groundwater by approximately 550 million gallons per year. As the GSWSA pumps approximately 1.72 billion gallons for its local service area yearly, base closure would reduce use of the local groundwater by approximately 32 percent and have a beneficial impact on this resource. In addition, closure of the base would reduce the potential for contamination of groundwater from accidental releases of hazardous substances.

**Surface Water.** Base closure would reduce the potential for contamination of surface water from accidental spills or releases of hazardous substances, or from runoff from industrial areas, aprons, roadways, and parking lots. As surface water contamination from these sources is not a problem at present (Section 3.1.3.2), this is considered a minor beneficial impact. In addition, the 32 percent reduction in wastewater flow to the Schwartz Wastewater Treatment Plant would result in a reduction in the volume of treated wastewater discharged to the Intracoastal Waterway. This would have a beneficial impact on the quality of water in the vicinity of the discharge.

The expected vacating of 1,200 housing units in Myrtle Beach would reduce use of water from the Intracoastal Waterway by about 170 million gallons per year, or 5 percent of the water pumped from the waterway by the city in 1989. This would have a small beneficial impact on the surface water resource of the area.

##### **4.1.3.3        Air Quality**

Implementation of base closure at Myrtle Beach AFB would produce short-term air quality impacts as a result of emissions from transport vehicles hauling personal belongings, equipment, and materials from the base. No air quality impacts are expected from the removal of hazardous materials or hazardous waste from the base since these activities would be conducted in accordance with strict federal and state regulations and guidelines. The expected increase in transport vehicle emissions during the implementation of the proposed action should be offset by the concurrent decrease in emissions because of reduction of normal base operations.

When base closure is complete, air emissions from the base would be drastically reduced as shown on Table 4.1.3-1. Emissions from military aircraft would be eliminated; however, some emissions from caretaker ground vehicles, employee commuting, building heating, and maintenance activities would continue. A 90 percent reduction in base emissions is therefore expected with base closure. The civilian aircraft operations associated with the Myrtle Beach Jetport would continue to produce emissions because this activity is not associated with base closure. Table 4.1.3-2 shows the estimated 1993 commercial aircraft operations emissions at the Myrtle Beach Jetport and the percent increase and/or decrease in emissions from 1987 combined military and civil aircraft operation emissions. Reduction of total base emissions by the amounts indicated in Table 4.1.3-1 would more than offset the estimated increase from future commercial aircraft. A reduction of approximately 88 tons per year (T/yr) of hydrocarbons, 577 T/yr of carbon monoxide, and 72 T/yr of nitrogen oxides would also be expected because of the removal of private vehicle emissions associated with the outmigration of civilian and offbase military personnel. However, since the area is in attainment with the state ambient air quality standards and the National Ambient Air Quality Standards for all criteria pollutants, the improvement in air quality would be minor.

#### **4.1.3.4 Noise**

Noise levels generated from ground transportation activities associated with base operations would be insignificant because of the reduction in military, commercial supplier, contractor, and dependent traffic. During drawdown and closure, the movement of equipment, supplies, household goods, and personnel may cause the local area traffic noise levels to increase slightly; however, this short-term effect would be offset by the overall reduction of military aircraft noise.

The closure of Myrtle Beach AFB would result in the withdrawal of all Air Force A-10 aircraft and transient military flights. The Myrtle Beach Jetport would continue civil aircraft operations. Noise level contours for base closure are shown in Figure 4.1.3-1. The size of the area within the 65 dB day/night sound level ( $L_{dn}$ ) contour would decrease from the existing 2,100 acres to 210 acres, a substantial decrease. Offbase residential areas in which approximately 300 persons reside would no longer be exposed to 65 to 75 dB noise levels.

The Federal Highway Administration noise model STAMINA was used to estimate the noise levels resulting from vehicular traffic on U.S. 17 and U.S. 17 Business. The present  $L_{dn}$  noise levels range from 60 to 63 dB at a distance of 100 feet from the highways. The projected reduction in traffic along these highways, due to base closure (Section 4.1.1.3), would result in lowering the  $L_{dn}$  values by 2 to 3 dB. These small reductions in highway noise levels would not be discernible. The highway noise impacts, therefore, would be minimal.

#### **4.1.3.5 Biological Resources**

**Vegetation.** Biological resources would experience both positive and negative impacts as a result of base closure. Habitat quality would improve to some degree in certain areas and decrease in others since habitat maintenance and improvement programs would be cancelled. Any potential for disturbance because of military operations would be removed, although the loading of equipment and property during closure may cause temporary damage to adjacent vegetated areas. This damage is expected to be negligible. Maintenance of landscaped areas and grass lawns would be reduced to levels necessary to retain a neat appearance. Species diversity of plants may increase to some extent in these areas to create some improvement in habitat quality. Management of forested areas is likely to cease, and dense understory would redevelop in controlled burn areas. Those areas that have not yet been burned would remain more or less the same although hardwoods would eventually become more dominant.

**Wildlife.** Base closure would have a minor negative impact on wildlife habitat and a minor positive impact on wildlife disturbance. Wildlife habitat in currently managed base forests would become less

Table 4.1.3-1

**Changes in Air Pollutant Emissions Resulting From  
Closure of Myrtle Beach AFB  
(tons per year)**

<b>Emission Source</b>	<b>Particulates</b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>HC</b>	<b>CO</b>
Myrtle Beach AFB Reduction <sup>1</sup>	6.48	53.1	120.6	501.3	838.8
Horry County	17,035	12,864	9,225	7,872	28,207
Percent Reduction in County Emissions	0.04	0.41	1.31	6.37	2.97

Notes: <sup>1</sup>Assumes 90 percent reduction in base emissions (see Table 3.1.3-4).

Table 4.1.3-2

**Estimated Emissions From Commercial Aircraft At  
Myrtle Beach Jetport After Closure of Myrtle Beach AFB (1993)  
(tons per year)**

<b>Year</b>	<b>Particulates</b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>HC</b>	<b>CO</b>
1987 <sup>1</sup>	10	20	187	577	856
1993 <sup>2</sup>	8	24	195	111	395
Percent Increase (Decrease)	(20)	19	4	(81)	(54)

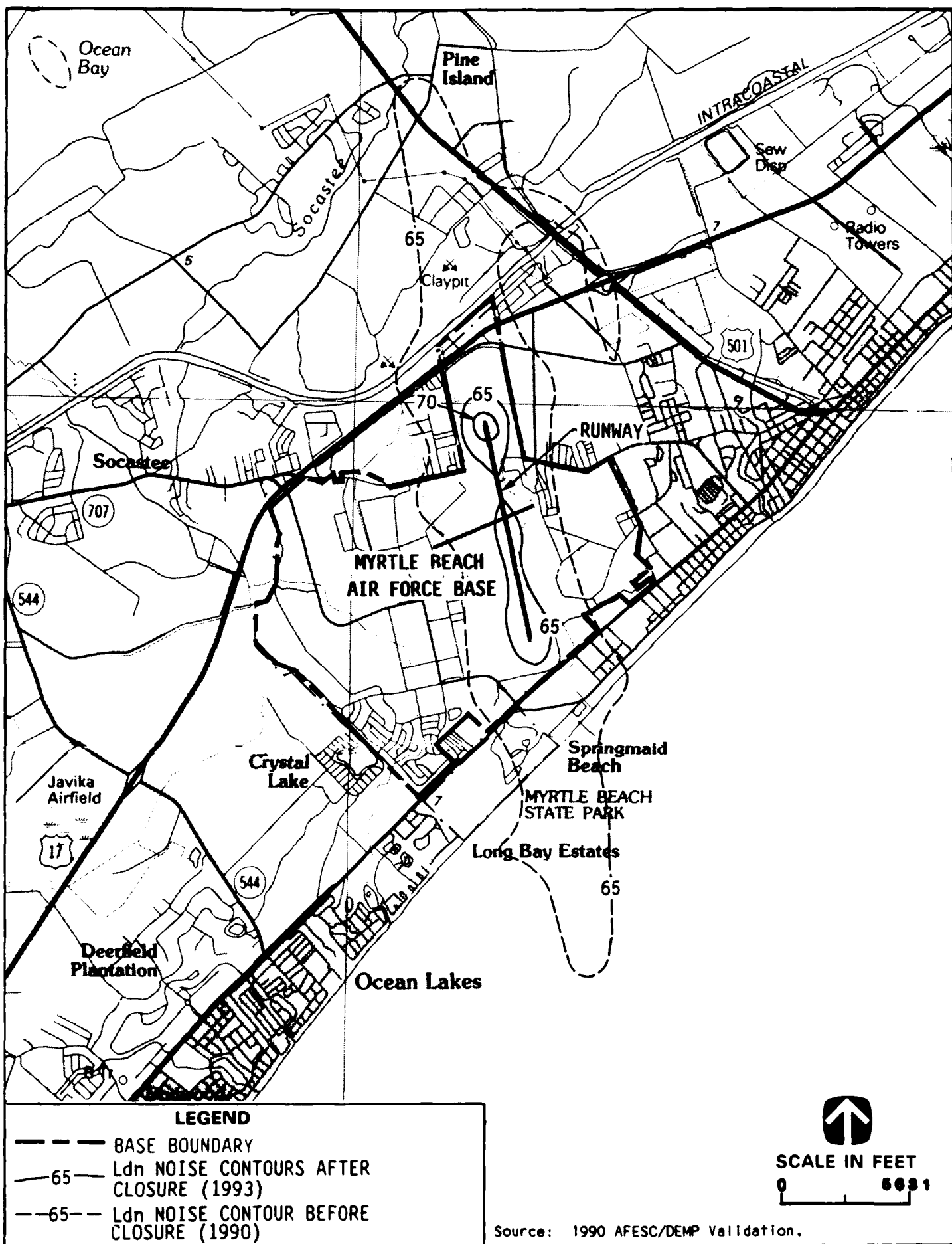
Notes: <sup>1</sup>Includes military and commercial aircraft.

<sup>2</sup>Commercial aircraft only. Based on projected 1993 aircraft operations (runway strengthened alternative) in Environmental Assessment for Amendment of the Joint Use Agreement on Myrtle Beach AFB, South Carolina (LPA Group 1989).

Source: LPA Group, 1988.

suitable as these areas become more densely vegetated. Wildlife food plots would no longer be maintained and would revert to a mixed herbaceous area if occasional maintenance is provided. Although such effects have not been documented, it is likely that current base activities such as aircraft operations, vehicular activities, construction, and general human activities cause some disturbance of wildlife onbase and in adjacent areas. Closure of the base would remove most of these sources of disturbance.

**Wetlands.** Base closure is not likely to have an effect on wetlands, because closure would cause no direct disturbance of wetlands and surface drainage patterns onbase would not change substantially. Without continual maintenance, the riverine systems onbase, which are actually man-constructed ditches, could become more heavily vegetated resulting in habitat improvement for reptiles and amphibians. If left unattended, the canals and ditches would eventually fill in, and shrubs and trees would become established to create new habitat.



**FIGURE 4.1.3-1 FUTURE AIRCRAFT NOISE CONTOURS, MYRTLE BEACH AFB, SOUTH CAROLINA, 1993 (1990 65 Ldn NOISE CONTOUR SHOWN FOR COMPARISON)**

***Threatened and Endangered Species.*** No threatened or endangered species would be affected by closure of Myrtle Beach AFB. Except for the American alligator, the presence of any federally listed species onbase or in adjacent areas is unlikely. In addition, base closure would not disrupt habitat or disturb biota that could affect endangered species adversely. For the same reasons, no impacts to other rare animal and plant species are expected to occur.

#### **4.1.3.6 Cultural and Paleontological Resources**

***Prehistoric Resources.*** Base closure would not result in an adverse impact on prehistoric resources. The 14 identified archaeological sites onbase have been highly disturbed and do not have sufficient integrity to be considered eligible for the National Register of Historic Places (NRHP) (Section 3.1.3.6).

***Historic Resources.*** Base closure activities would not have an impact on historic resources. Under caretaker status, the three structures and one historic complex considered potentially NRHP eligible would not deteriorate in a manner that would affect their potentially significant characteristics.

Additional documentation and archival research will be needed to formally evaluate these sites for their eligibility. NRHP nominations will need to be prepared prior to disposition of the property. A Memorandum of Agreement between the base, State Historic Preservation Officer, and Advisory Council on Historic Preservation should be prepared along with a mitigation plan indicating how the NRHP-eligible sites will be taken into account during reuse planning and development. Specific site treatments are negotiable and depend largely on local and regional issues, guidelines, and precedents.

***Paleontological Resources.*** Base closure would not affect paleontological resources because fossiliferous formations are buried at depths of at least 50 feet.

#### **4.1.4 Potential Mitigation Measures**

The caretaker team would maintain buildings, grounds, and water supply/utility systems, and would provide adequate security. This would further reduce any potential environmental impacts until the final disposition of the property.

#### **4.1.5 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment**

The overall impacts to the environment from the closure of Myrtle Beach AFB would be beneficial in the short term. The long-term impacts are unknown because the future uses of the base have not been determined.

#### **4.1.6 Irreversible and Irretrievable Commitment of Resources**

The resources irreversibly and irretrievably committed in the proposed base closure or closures and realignment of units would be minimal. Some energy resources would be expended in moving realigned units and there would be some minor construction at the receiving bases to accommodate these units. Base closure would generally reduce the commitment of resources to defense programs.

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## **4.2 DAVIS-MONTHAN AIR FORCE BASE, ARIZONA**

### **4.2.1 Local Community**

The Air Force is sensitive to the adverse effects on the community that may be caused by closing a major employer like Davis-Monthan AFB. Therefore, the Air Force has advised the local communities that planning assistance is available from the OEA, as discussed in Section 4.1.1.

#### **4.2.1.1 Community Setting**

The potential socioeconomic effects of the closure of Davis-Monthan AFB on the City of Tucson and Pima County were evaluated on the basis of projected changes in area employment and population. The direct economic effects of closure involve decreases in military and civilian employment and income on the base, as well as reductions in Air Force procurement of goods and services from the region. The indirect effects of closure were estimated through the application of the Economic Impact Forecast System (EIFS) model, as described in Section 4.1.1.1.

The closure of Davis-Monthan AFB would reduce employment in the local area by nearly 10,400 jobs including 6,830 military and civilian jobs onbase and about 3,600 secondary jobs. This reduction in employment would result in a decrease in personal income of about \$200 million annually and a decrease in local spending (including personal consumption expenditures and base procurement) of about \$253 million annually.

All military employees would be relocated, and it is projected that approximately 25 percent of direct and 10 percent of secondary civilian employees would also relocate to other areas. It is also expected that up to 10 percent of local military retirees would relocate closer to other active installations. Total population outmigration is projected to be approximately 15,700 people when the base would be completely closed in 1993. This represents about 2.3 percent of the current population in Pima County.

These reductions in employment and population may result in other socioeconomic effects such as increases in housing vacancy rates and the closure of certain public and commercial facilities. However, these socioeconomic consequences would not result in impacts to the biophysical environment and are not addressed in this document.

A separate Local Economic Consequences Study is being prepared by the Air Force which will address in greater detail the effects closure may have on such socioeconomic resources. The Air Force will consult with state and local officials during preparation of the Local Economic Consequences Study. Copies of the economic study will be made available to members of Congress, state and local officials, and state Single Points of Contact under Executive Order 12372 *Intergovernmental Review of Federal Programs*.

#### **4.2.1.2 Land Use and Aesthetics**

**Land Use.** Davis-Monthan AFB is located on a patchwork of land owned by the Air Force, or lands that are public domain, leased from public agencies and private parties, donated by the City of Tucson, and permitted from the Bureau of Land Management. Closure of the base would have no effect on land ownership because the Air Force would retain ownership until an appropriate reuse has been determined. For other than fee-owned lands, the Air Force would negotiate agreements addressing reversion timetables, disposition of buildings and other structures, and other related issues.

Closure of Davis-Monthan AFB would result in cessation of all existing onbase land uses, except for Aerospace Maintenance and Regeneration Center (AMARC) and U.S. Customs operations. The airfield would remain open and be maintained for uses related to AMARC and U.S. Customs

activities. Management facilities would be vacated until reuse of the property is determined, and until that time, a caretaker program would provide minimal maintenance of the closed portion of the base and associated facilities. Closure would potentially result in beneficial effects on offbase land use. Residential areas (980 acres) northwest of the base would no longer lie within the  $L_{dn}$  65 dB to 75 dB noise contours. Accident Potential Zones (APZs) and structure height limits would remain due to continued aircraft operations associated with AMARC and U.S. Customs, and existing incompatible uses in the north APZs 1 and 2 would continue to exist.

The City of Tucson and Pima County would be responsible for any revisions to land use plans and zoning regulations that currently incorporate Air Force recommendations regarding compatible land uses near air bases.

**Aesthetics.** No construction or demolition activities are planned as part of the proposed action. The installation would be under government control within a secured boundary. Buildings and grounds would be minimally maintained until final disposition is decided. Therefore, some change in aesthetics and visual resources is anticipated.

#### **4.2.1.3 Transportation**

**Transportation Systems.** Closure of Davis-Monthan AFB would have a primarily beneficial effect on transportation systems. Highway traffic in the vicinity of the base would be reduced after closure, and the cessation of military aircraft operations would reduce air traffic in the area. Railways would not be used for closure-related transport.

**Ground Traffic.** During the closure period, traffic would increase due to freight shipments of equipment, supplies, and materials from Davis-Monthan AFB to the receiving locations. It is estimated that 5,170 military and 1,050 civilian employees, would relocate as a result of base closure. Each employee represents a workstation that contains, on average, 3,000 pounds of equipment. Employee workstation equipment and supplies, therefore, represents 9,330 tons of materials that would be transported from Davis-Monthan AFB to receiving locations. Based on a truck capacity of 9 tons (18,000 pounds), approximately 1,037 truck-trips would be required to transport workstation equipment during the closure period.

Household goods would also be transported from Davis-Monthan AFB during the closure period. Based on 2,170 employees living onbase, a ratio of 65 percent accompanied and 35 percent unaccompanied employees, five rooms per accompanied and three rooms per unaccompanied employee, and 1,000 pounds per room, approximately 4,670 tons of household goods would be transported during the closure period. Assuming a truck capacity of 9 tons, approximately 520 truck-trips would be required to transport household goods from Davis-Monthan AFB to the receiving locations.

Based on the above assumptions, a total of 1,557 truck-trips would be generated by the transport of workstation equipment and onbase household goods during the closure of Davis-Monthan AFB. Even if the transport of equipment and household goods was limited to 10 days each quarter over the five-quarter closure period, only about 31 truck-trips per day would be added to the local roadway network. These additional vehicle trips would represent a very small increase to existing traffic volumes on the highways directly serving the base and the other major arterials in the base vicinity. In addition, these truck-trips could be scheduled to avoid morning and afternoon peak traffic times. Therefore, closure-related truck transport should have a minimal effect on traffic flow in the base vicinity.

Transport of household goods for base military and civilian employees living offbase who would leave the Tucson area would amount to 7,450 tons and would require 830 truck-trips over the 1-year drawdown period. Transport of household goods for persons leaving the area because of secondary

economic effects (Section 4.2.1.1) would be distributed over a longer period. In addition, these persons would leave from locations dispersed throughout the Tucson area. Therefore, it is very unlikely that transport of these persons and household goods would generate enough truck traffic at the same time and place to affect local traffic flow.

Once the base is closed, daily traffic generated by the base would be removed from local roadways. The reduction in traffic would primarily affect roadways that provide access to the base. These roadways include Claycroft Road, Golf Links Road, Swan Road, Wilmot Road, 22nd Street, and Broadway. The reduction in traffic volumes is not expected to affect level of service or traffic flow on these roadways because of the relatively free flow conditions currently experienced throughout the day. Nevertheless, the reduction in traffic flow would beneficially affect the local roadways by removing from 3 to 35 percent of peak hour traffic. This would result in improved traffic safety and would postpone any congestion that might develop from increased traffic volumes in the future.

Additionally, traffic would be removed from Wilmot Road and Nicaragua Drive. However, since traffic count data are not available for these road segments, it is not possible to quantify the resulting reduction as a percentage of current traffic. Gate count data indicate that during the afternoon peak hour, 717 vehicles travel north on Wilmot Road. This amount of traffic would therefore be eliminated from the road, resulting in a reduction in traffic levels.

**Air Traffic.** With base closure, most aircraft operations from the base, except those needed to support the U.S. Customs Service and AMARC, would cease, reducing air traffic in the area by approximately 30,000 sorties per year. This would simplify the air traffic control situation in the base vicinity, particularly coordination of control between the base and Tucson International Airport. Because congestion is minimal at present, this is a minor improvement. The airport's control tower would assume visual control of air traffic northeast (in addition to southwest) of Interstate 10 to a distance of 10 nautical miles. The FAA would assume all responsibility for the Tucson radar approach control.

The closure of Davis-Monthan AFB would likely result in decreased utilization of special use airspace and military training routes. Scheduling responsibility for airspace controlled by Davis-Monthan AFB would likely be transferred to another Department of Defense (DOD) installation currently using or expected to use the airspace. If no DOD user is identified then the airspace could be returned to the FAA for inclusion into the National Airspace System.

#### 4.2.1.4 Utilities

**Water Supply.** Davis-Monthan AFB supplies its own water needs through a series of nine base-operated wells and does not use the local city and county water sources. Closure of Davis-Monthan AFB would reduce the amount of groundwater pumped, but would not eliminate the need for base-supplied water since some usage would be required for AMARC and U.S. Customs demand and for caretaker activities in the interim period until final disposition of the base is determined. Base closure would result in the vacating of approximately 5,000 offbase units occupied by military or civilian employees of the base, or by other persons who would leave the area as a result of base closure. Assuming a usage rate of 350 gallons of water per unit per day, this represents a reduced daily water consumption of approximately 1,750,000 gallons, or 2.1 percent of the average daily usage of 83,230,000 for the Tucson metropolitan area.

**Wastewater Treatment.** The closure of Davis-Monthan AFB would result in the reduction of approximately 1.1 MGD of base-generated wastewater or 3.6 percent of the annual average flow of wastewater treated at the Pima County Roger Road Treatment Plant. Wastewater flows would be reduced an additional 1.1 MGD due to outmigration of base military and civilian employees who live offbase, and of other persons expected to leave the area due to base closure. Using the worst case assumption that all these persons live in the Roger Road Treatment Plant service area results in an

additional 3.6 percent reduction in the flows to the plant. These combined wastewater flow reductions of 7.2 percent due to base closure would have no direct adverse impact on the capacity or operation of the Roger Road Treatment Plant.

**Solid Waste.** Base closure would result in a short-term increase in the amount of solid waste generated by the base from closure and removal activities and disposed of in the City of Tucson Los Reales Landfill. The reduction in the solid waste normally generated by the base of 3,500 T/yr would offset this short-term increase in the long term and extend the useful life of the Los Reales Landfill by approximately 30 days, assuming the current fill rate.

**Energy.** Closure of Davis-Monthan AFB would result in an annual reduction of approximately 70 million kilowatt-hours (kWh) or 1.1 percent of the amount of electric power provided by the Tucson Electric Power Company in the Tucson service area. Base closure, however, would not eliminate all power consumption at the base since some electrical usage would be required for AMARC and caretaker activities until final disposition of the base is determined. Residential units occupied by military and civilians and vacated due to base closure would reduce local electric power consumption an additional 36 million kWh (0.6%) per year. No adverse effect on Tucson Electric Power is expected due to closure of Davis-Monthan AFB.

Base closure would also reduce annual natural gas usage in the Southwest Gas Corporation Tucson service area by approximately 200 million cubic feet or 1.1 percent. Offbase residential units occupied by military and civilians and vacated due to base closure would reduce natural gas consumption by an additional 230 million cubic feet. No effect on Southwest Gas Corporation operations is expected.

#### **4.2.2 Hazardous Materials/Waste Management**

##### **4.2.2.1 Hazardous Materials Management**

With base closure, hazardous materials used and stored at the Base Supply Main Warehouse, the Base Supply Chemical Warehouse, and at the various industrial facilities throughout the base, other than AMARC facilities, would be shipped and used elsewhere or sold as excess in accordance with applicable federal and state regulations. Hazardous materials collected during the base closure process would be disposed of through the Davis-Monthan AFB DRMO, Building 7815. Hazardous materials necessary for the operation of AMARC and used at AMARC industrial facilities would continue to be stored at the AMARC Supply Warehouse (Building 7236). A small amount of hazardous materials such as gasoline, oils, herbicides, and pesticides would continue to be stored and used onbase for maintenance of the base facilities during the caretaker period. A minor beneficial impact to public health, water resources, soils, and biological resources would result due to the inventory reduction and related reduced potential for spills, and limited use of hazardous materials on the base after closure.

**Aboveground and Underground Storage Tanks.** Most of the aboveground storage tanks and associated piping at Davis-Monthan AFB not necessary for AMARC operation would be drained and rendered temporarily out of service. Aboveground tanks containing heating oil for buildings and other tanks necessary for maintenance of the base during caretaker activities would remain in service.

Closure of Davis-Monthan AFB would also require that most of the 105 USTs at the base, except those necessary for continued operation of AMARC, be taken temporarily out of operation, upgraded, or permanently closed. A limited number of tanks required for caretaker activities would also remain in service until final disposition of the base is determined. The 46 regulated underground tanks onbase would be subject to special provisions. Regulated tanks taken out of service for more than 3 months but less than 12 months would be drained, but would continue to be subject to the operating requirements under 40 CFR 280.31 and any release detection in accordance with Subpart D, Arizona Statute 49-1001 through 1021, and the Underground Storage Tank Management Plan for Davis-

Monthan AFB (June 1989). Tank vent lines would remain open and functioning; all other lines, pumps, manways, and ancillary equipment would be capped and secured.

Tanks taken out of service for more than 12 months must be permanently closed if they do not meet either performance standards in 40 CFR 280.20 for new UST systems or the upgrading requirements in CFR 280.21, except that the spill and overfill equipment requirements would not have to be met. Substandard UST systems (not meeting upgrading requirements) must be permanently closed at the end of the 12-month period in accordance with 40 CFR 280.71-280.74, unless the Arizona Department of Environmental Quality provides an extension of the 12-month temporary closure period. Before an extension can be applied for, a site assessment in accordance with CFR 280.72 must be completed. Underground tanks permanently closed would be emptied and cleaned by removing all liquids and accumulated sludges, and either removed from the ground or filled with an inert solid material according to 40 CFR 280.71(b).

The reduced use of the aboveground and underground storage tanks at Davis-Monthan AFB is expected to have a minor beneficial impact on the environment by reducing the potential for future spills or leaks to contaminate soil and water resources.

**Pesticides/Herbicides.** Chemicals used to control pest infestations and ground foliage would be necessary for maintenance activities on the base during the caretaker period and continued operation of AMARC. However, the amount of pesticides and herbicides stored and used during this period would be much smaller than that for normal operation of the base. Chemicals determined to be unnecessary for caretaker maintenance activities would be disposed of through the DRMO.

**Other Hazardous Materials.** All other hazardous materials, such as acids, compressed gases, and solvents, not needed for maintenance of the base until final disposition is determined or for operation of AMARC, would be shipped and used elsewhere or sold as excess in accordance with applicable federal and state regulations through the DRMO.

#### **4.2.2.2 Hazardous Waste Management**

Closure of Davis-Monthan AFB would eliminate approximately 700 pounds of the approximately 2,000 pounds of hazardous waste currently generated by the base per month. The AMARC will continue to generate, manage, and dispose of their hazardous wastes as directed by applicable regulations and management plans. Base closure would also eliminate the need for and operation of six hazardous waste accumulation points and one of two TSD facilities located onbase. The AMARC Paint (Building 7327), Small Parts Washrack (Building 7401), Corrosion Control (Building 7425), and Materials Lab (Building 7615) accumulation points would remain in operation to support AMARC activities during drawdown and after closure of other base facilities. The DRMO Storage Facility (Building 7815) would also remain in operation to accept hazardous materials/wastes from DOD activities within its jurisdiction. The Hazardous Waste Management Plan (January 1990) for Davis-Monthan AFB and applicable State of Arizona implemented RCRA regulations would continue to be enforced during base drawdown. Hazardous wastes collected during the base closure process would be disposed of through the Davis-Monthan AFB DRMO.

**Treatment, Storage, and Disposal Facilities.** The DRMO Storage Facility, Building 7815, would remain in operation under base closure. The 836th Air Base Operability Squadron Explosive Ordnance Disposal (EOD) Range, which is also a TSD facility regulated by 40 CFR 265, would be closed in accordance with the approved Closure Plan and Post-Closure Plan for that facility. The Closure Plan for the EOD Range TSD facility briefly describes the facilities, procedures for removing all waste inventory and decontamination of the facility, Closure Certification procedures, and post-closure contact. The reduction of current hazardous waste disposal activities and the potential for spills would result in a minor beneficial impact on public health, water and biological resources, and soils.

#### **4.2.2.3 Installation Restoration Program Sites**

Activities to remediate past hazardous waste sites identified in the IRP would continue at Davis-Monthan AFB. IRP Remedial Investigation/Feasibility Studies and subsequent remedial action is independent of the base closure process and will continue until remediation is completed. Development or reuse of those sites for which continued monitoring and/or feasibility studies have been recommended may be restricted until any required federal actions have been completed or the site is determined to require no further action.

#### **4.2.2.4 Asbestos**

An asbestos survey of Davis-Monthan AFB completed in 1988 indicated no friable (prone to release of airborne asbestos fibers) asbestos materials were present which could pose a potential public health risk. All asbestos on the base will be handled in accordance with the Air Force Policy on management of asbestos at bases for which the General Services Administration is the disposal agent (Appendix D).

#### **4.2.2.5 Polychlorinated Biphenyls**

All PCB-contaminated transformers are scheduled to be removed from service and processed through DRMO for disposal before 1992. Therefore, no effect from base closure is expected.

#### **4.2.2.6 Radon**

Radon concentrations onbase are well below levels considered potentially hazardous. Therefore, no effect from base closure is expected.

#### **4.2.2.7 Radioactive Waste**

The low-level radioactive waste disposed of onbase would be removed prior to final closure. The encased low-level radioactive waste material would be excavated and transported to a permitted disposal facility. Currently there are three low-level waste disposal sites: Barnwell, South Carolina; Beatty, Nevada; and Richland, Washington. Transport, disposal, and safety procedures would comply with all local, state, and federal regulations administered by the Nuclear Regulatory Commission under 10 CFR 20, and the Environmental Protection Agency (EPA) under 40 CFR 191. Minimal effects would result from removal activities.

#### **4.2.2.8 Ordnance**

With base closure, all ordnance would be removed from the base in accordance with state and federal regulations, and the related potential hazards would be removed.

### **4.2.3 Natural Environment**

#### **4.2.3.1 Geology and Soils**

**Geology.** Withdrawal of personnel, equipment, and supplies from Davis-Monthan AFB would have no effect on the geology of the area. Additionally, because the federal government would retain ownership and mineral rights, there would be no effect on the availability of mineral resources which may be considered commercially valuable.

**Soils.** Closure of Davis-Monthan AFB may have some positive impacts on base soils since there would not be any new construction of military facilities, and consequently, no grading, excavation, erosion, or other disturbance of topsoil. Additionally, risk of new soil contamination due to spills or accidental release of hazardous materials caused by military operations would be reduced

significantly. Soils that are currently contaminated with hazardous wastes would continue to be remediated under the IRP, as described in Section 4.2.2.3.

#### **4.2.3.2 Water Resources**

**Groundwater.** Davis-Monthan AFB obtains its water from nine production wells which tap the Tinja Beds and Fort Lowell formations beneath the base. The average annual water use for the base in 1988 and 1989 was 1,923 acre-feet or 667 million gallons, or about 1.8 million gallons per day. Vacating of offbase residences by base employees or other persons expected to leave the area due to base closure would reduce water usage by an additional 1.75 million gallons per day. For the metropolitan Tucson Area, city and county water agencies pumped an average 83.2 million gallons per day from the local aquifer. Based on these estimates, closure of the base would decrease the pumping demand on the aquifer by approximately 4 percent. This would represent a minor beneficial impact on the local groundwater resource.

**Surface Water.** There are no surface waters on Davis-Monthan AFB, and drainageways, like many in the Desert Southwest, are dry most of the year and flow only during and immediately following storms. The potential for nonpoint source surface water contamination from normal base operation, runway runoff, and construction activities would be reduced. In addition, the chance of an accidental spill of hazardous materials would be reduced. Closure of the base would also reduce the amount of wastewater effluent treated (7.2%) at the Pima County Roger Road Treatment Plant and discharged to the Santa Cruz River. This would have a minor beneficial impact on water quality near the point of discharge.

#### **4.2.3.3 Air Quality**

Closing Davis-Monthan AFB would produce short-term air quality impacts as a result of emissions from transport vehicles hauling personal and household belongings, equipment, and materials from the base. The expected increase in transport vehicle emissions as a result of the proposed action would be offset by the concurrent decrease in emissions because of a reduction in normal base operations. Pollutant emissions from the transport trucks would be less than 1 percent of the pollutant emissions decrease resulting from the reduction in base operations.

Table 4.2.3-1 presents the pollutant emissions reduction that would be accomplished when the base closure is complete. It is estimated that base emissions during closure would be 25 percent of present levels, due to AMARC and caretaker activities. Table 4.2.3-1 also shows the percent reduction in Pima County emissions as a result of the base closure. Overall, the decrease in pollutant emissions results in about a 1 percent reduction in the Pima County pollution burden. Although this reduction in pollutant emissions is minor, it would improve air quality in the county.

#### **4.2.3.4 Noise**

The closure of Davis-Monthan AFB would substantially reduce aircraft operations and the noise resulting from these activities. The noise levels would be reduced by  $L_{dn}$  10 dB to 25 dB on the base, assuming a residual background noise level of  $L_{dn}$  55 dB. The sensitive receptors (schools and residences) located 2 to 4 miles from the northwest end of the runway would experience reductions of  $L_{dn}$  10 dB to 20 dB in the present  $L_{dn}$  noise levels. These noise level reductions would be beneficial to approximately 4,300 residents currently living in areas exposed to noise levels of  $L_{dn}$  65 to 75 dB. Some aircraft noise would continue to exist due to remaining aircraft operations such as those required for AMARC and U.S. Customs activities.

Short-term traffic noise on the roadways in the vicinity of the base would be increased by the additional truck traffic resulting from transporting personal and household belongings, equipment, and materials from the base during closure. However, calculations using the Federal Highway

Table 4.2.3-1

**Changes in Air Pollutant Emissions  
Resulting from Davis-Monthan AFB Closure  
(tons per year)**

<b>Emission Source</b>	<b>Particulates</b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>HC</b>	<b>CO</b>
Davis-Monthan AFB Reduction <sup>1</sup>	20.8	27.6	211.4	543.9	1,342.5
Pima County	179,793	17,701	23,491	33,108	82,942
Percent Reduction in County Emissions	0.01	0.16	0.90	1.64	1.62

Notes: <sup>1</sup>Assumes 75 percent reduction in base emissions (see Table 3.2.3-4).

Administration noise model STAMINA indicated that the increase would be less than 1 dB. This increase would also be offset by the concurrent decrease in noise levels resulting from a decrease in base-related traffic as normal base operations are reduced. The STAMINA model calculations indicate that the net decrease in L<sub>dn</sub> noise levels after the base closure is complete would be 2 dB to 3 dB on the roadways in the vicinity of the base. These small reductions in highway noise levels would not be discernible. The highway noise impacts, therefore, would be minimal.

#### 4.2.3.5 Biological Resources

**Vegetation.** Biological resources would experience both positive and negative impacts as a result of base closure. Habitat quality at Davis-Monthan AFB would improve to some degree in certain areas and decrease in others depending on the habitat maintenance and improvement programs that are canceled and the past military operations conducted in the area. Maintenance of landscaped areas would be reduced to levels necessary to retain a neat appearance. The land areas previously disturbed by grading, clearing, or excavation for base mission activities would be recolonized by desert scrub vegetation. This would increase the desert scrub habitat available for wildlife but not necessarily improve the habitat quality in the area.

**Wildlife.** The reduction of base operations would have a positive impact on the area's wildlife, but to an unknown degree. Although such effects have not been documented, some current base activities such as aircraft operations, vehicular activities, construction, and general human activities could cause some disturbance of wildlife onbase and in adjacent areas. Closure of the base would remove most of the sources of disturbance.

The present base wildlife population levels are expected to remain fairly stable for the short term. Although certain aspects of the base wildlife management plan that would augment the habitat in selected areas of the base may not be implemented before closure, the reversion of some areas to a more natural habitat and the lack of human activity would increase the quality of the habitat, especially for animals less tolerant of humans. Long-term impacts to wildlife would be dependent upon the ultimate use of the base property and are beyond the scope of this document.

**Wetlands.** There are no wetlands on Davis-Monthan AFB and therefore base closure would have no impact to wetlands.

**Threatened and Endangered Species.** Base closure is not expected to adversely affect threatened and endangered species because no such species are known to occur on the base. There is a potential for the occurrence of the desert tortoise and the Tumamoc globeberry; however, closure would not disrupt habitat nor disturb biota. Therefore, there would be essentially no potential for adverse impacts to these species if they do occur onbase. During the closure period, disturbance of any protected animals, and the potential for loss of any protected plants or animal habitat, would be reduced from current levels.

#### **4.2.3.6 Cultural and Paleontological Resources**

**Prehistoric Resources.** Approximately 85 percent of the undeveloped lands involved in the proposed action have been inventoried for cultural resources. Six prehistoric sites have been previously recorded on the base and are considered potentially eligible for the NRHP. The prehistoric sites have relatively low visibility and are not likely to be affected by base closure.

Test excavations would be needed to formally evaluate these sites for eligibility to the NRHP. NRHP nominations would need to be prepared prior to disposition of the property. A Memorandum of Agreement between the base, State Historic Preservation Officer, and Advisory Council on Historic Preservation should be prepared along with a mitigation plan indicating how the NRHP-eligible sites would be taken into account during reuse planning and development. Specific site treatments are negotiable and depend largely on local and regional issues, guidelines, and precedents.

**Historic Resources.** One hangar at Davis-Monthan AFB is considered NRHP eligible; however, the building would not be affected by base closure activities.

**Paleontological Resources.** Paleontological resources that may occur in alluvium at Davis-Monthan AFB would not be considered scientifically important; therefore, base closure activities would not cause an impact.

#### **4.2.4 Potential Mitigation Measures**

The caretaker team would maintain buildings, grounds, and water supply/utility systems, and would provide adequate security. This would further reduce any potential environmental impacts until the final disposition of the property.

#### **4.2.5 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment**

The overall impacts to the environment from the closure of Myrtle Beach AFB would be beneficial in the short term. The long-term impacts are unknown because the future uses of the base have not been determined.

#### **4.2.6 Irreversible and Irretrievable Commitment of Resources**

The resources irreversibly and irretrievably committed in the proposed base closure or closures and realignment of units would be minimal. Some energy resources would be expended in moving realigned units and there would be some minor construction at the receiving bases to accommodate these units. Base closures would generally reduce the commitment of resources to defense programs.

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### **4.3 ENGLAND AIR FORCE BASE, LOUISIANA**

#### **4.3.1 Local Community**

The Air Force is sensitive to the adverse effects on the community that may be caused by closing a major employer like England AFB, Louisiana. Therefore, the Air Force has advised the local communities that planning assistance is available from the OEA, as discussed in Section 4.1.1.

##### **4.3.1.1 Community Setting**

The potential socioeconomic effects of the closure of England AFB on the City of Alexandria and Rapides Parish were evaluated on the basis of projected changes in area employment and population. The direct economic effects of closure involves decreases in military and civilian employment and income on the base, as well as reductions in Air Force procurement of goods and services from the region. The indirect effects of closure were estimated through the application of the Economic Impact Forecast System (EIFS) model (Section 4.1.1.1).

The closure of England AFB would reduce employment in the local area by approximately 4,800 jobs including 3,675 military and civilian jobs onbase and approximately 1,200 secondary jobs. This reduction in employment would result in a decrease in personal income of about \$86 million annually and a decrease in local spending (including personal consumption expenditures and base procurement) of about \$111 million annually.

All military employees would be relocated, and it is projected that approximately 25 percent of direct and secondary civilian employees would also relocate to other areas. It is also expected that up to 25 percent of local military retirees would relocate closer to other active installations. Total population outmigration is projected to be approximately 11,650 people when the base would be completely closed in 1993. This represents about 7.6 percent of the current population in Rapides Parish.

These reductions in employment and population may result in other socioeconomic effects such as increases in the housing vacancy rates and the closure of certain public and commercial facilities. However, these socioeconomic consequences would not result in impacts to the biophysical environment and are not discussed in this document.

A separate Local Economic Consequences Study is being prepared by the Air Force which will address in greater detail the effects closure may have on such socioeconomic resources. The Air Force will consult with state and local officials during preparation of the Local Economic Consequences Study. Copies of the economic study will be made available to members of Congress, state and local officials, and state Single Points of Contact under Executive Order 12372 *Intergovernmental Review of Federal Programs*.

##### **4.3.1.2 Land Use and Aesthetics**

**Land Use.** Closure of England AFB would have no effect on land ownership because the Air Force would retain the property until an appropriate reuse has been determined. However, closure would affect the occupancy of mission-related facilities, housing, and community services onbase. Facilities would be vacated until the reuse of the property is determined, and until that time, a caretaker program would provide maintenance to prevent deterioration and retain a positive appearance. The closure is expected to have potentially beneficial impacts on surrounding land use because of reductions in both noise and potential aircraft accidents in areas near the base. The Accident Potential Zones (APZs) would no longer exist, so that single family houses would no longer lie in these zones. In addition, 160 acres of residential area would no longer be exposed to noise levels of  $L_{dn}$  65 to 75 dB.

Rapides Parish and the City of Alexandria would be responsible for any amendments to land use plans and zoning ordinances that control land use around the base as a result of base closure.

**Aesthetics.** No construction or demolition activities are planned as part of the proposed closure action. The installation would be under Air Force control within a secured boundary. Buildings and grounds would be minimally maintained until final disposition is decided. Therefore, some change in aesthetics and visual resources is anticipated.

#### 4.3.1.3 Transportation

**Transportation Systems.** Closure of England AFB would have a primarily long-term beneficial effect on transportation systems. Highway traffic in the vicinity of the base would be reduced after closure, and the cessation of military aircraft operations would reduce air traffic in the area. Railways would not be used for closure-related transport.

**Ground Traffic.** During the closure period, traffic would increase due to freight shipment of equipment, supplies, and materials from England AFB to the receiving locations. It is estimated that 2,570 military and 520 civilian employees would relocate as a result of base closure. Each employee represents a workstation that contains, on average, 3,000 pounds of equipment. Employee workstation equipment and supplies, therefore, represents 4,635 tons of materials that would be transported from England AFB to receiving locations. Based on a truck capacity of 9 tons (18,000 pounds), approximately 515 truck-trips would be required to transport workstation equipment during the closure period.

Household goods would also be transported from England AFB during the closure period. Based on approximately 1,100 employees living onbase, a ratio of 65 percent accompanied and 35 percent unaccompanied employees, five rooms per accompanied and three rooms per unaccompanied employees, and 1,000 pounds per room, approximately 2,375 tons of household goods would be transported during the closure period. Assuming a truck capacity of 9 tons, approximately 264 truck-trips would be required to transport household goods from England AFB to the receiving locations.

Based on the above assumptions, a total of 779 truck-trips would be generated by the transport of workstation equipment and onbase household goods during the closure of England AFB. Based on the transport of equipment and household goods on 10 days each quarter over the three-quarter closure period, approximately 26 truck-trips per day would be added to the local roadway network. These additional vehicle trips would represent a very small increase to existing traffic volumes on the highways and arterials directly serving the base (State Highways 1 and 28; and Air Base Road, England Drive, Bayou Rapides Road, and Vandenberg Drive) and the other highways in the base vicinity (U.S. 71, 165, and 167). In addition, these truck-trips would be scheduled to avoid morning and afternoon peak traffic times. Therefore, closure-related truck transport should have minimal effect on traffic flow in the base vicinity.

Transport of household goods for base military and civilian employees living offbase who would leave the Alexandria area would amount to 4,200 tons and require 470 truck-trips over the 1-year drawdown period. Transport of household goods for persons leaving the area because of secondary economic effects would be distributed over an even longer period. In addition, these persons would leave from locations dispersed throughout the area. Therefore, it is very unlikely that transport of these persons and household goods would generate enough truck traffic at the same time and place to affect local traffic flow.

Once the base is closed, daily traffic generated by the base would be removed from local roadways. The reduction in traffic would primarily affect roadways that provide access to the base. These roadways include Air Base Road, England Drive/State Highway (LA) 498, LA 1 North, LA 496, Vandenberg Drive/County Highway 3054, and Gardner Highway/LA 28. Based on a comparison of

average daily traffic (ADT) counts on these roadways, the reductions in base-contributed traffic are presented in Table 4.3.1-1.

This reduction in traffic volumes is not expected to affect level of service and traffic flow on these roadways because of the relatively free flow conditions currently experienced throughout the day. Nevertheless, the reduction in traffic flow would beneficially affect the local roadways by removing from 12 to 40 percent of ADT. This would result in improved traffic safety and would postpone any congestion that might develop from increases in future traffic volumes.

**Air Traffic.** The closure of England AFB would reduce military operations in the vicinity of the base by more than 48,000 operations annually and would eliminate the need for an air traffic control tower at the base. Operations at the base currently comprise 66 percent of the total annual operations in the Alexandria Radar Approach Control area. Closure of England AFB would require transfer of air traffic control responsibility to the FAA.

The closure of England AFB would likely result in decreased utilization of special use airspace and military training routes. Scheduling responsibility for airspace controlled by England AFB would likely be transferred to another DOD installation currently using or expected to use the airspace. If no DOD user is identified then the airspace could be returned to the FAA for inclusion into the National Airspace System.

#### 4.3.1.4 Utilities

**Water Supply.** Base closure would result in a reduction of approximately 170 million gallons, or 2 percent of total demand for water produced by the City of Alexandria. The water supply needs for England AFB would not be totally eliminated because caretaker activities at the base would continue while the ultimate use for the base is decided. Vacating of approximately 4,400 offbase residences by military and civilian employees of the base, and others expected to leave the area due to base closure, would reduce local water use by an additional approximately 560 million gallons per year,

**Table 4.3.1-1**  
**Reduction in Traffic Volume on Roadways**  
**Near England AFB as a Result of Base Closure**

Roadway	Segment	Percent Reduction
Air Base Road	South of LA 1	40
LA 498	East of Air Base Road	12
LA 1	South of Air Base Road	39
LA 496	East of Vandenberg Drive	13
Vandenberg Drive	North of LA 28	39
LA 28	West of Vandenberg Drive	13
LA 28	East of Vandenberg Drive	40

Source: Rapides Area Planning Commission 1989.

or about 7 percent. The anticipated total drop in water demand (9%) is considered a minimal impact on the City of Alexandria water system.

**Wastewater.** The closure of England AFB would result in the loss of approximately 300,000 gallons a day or 3.1 percent of the total daily flow to the Alexandria treatment plant. The loss of this flow would not affect the operation of the plant. The vacating of offbase residences inhabited by military and civilian employees of the base, and by people expected to leave the area due to secondary economic effects, would further reduce the flow by approximately 1 MGD per day or 10.5 percent of the total average daily flow of the plant. Therefore, the total effect of base closure on the wastewater treatment plant is a reduction of 13.6 percent of the average daily flow of the plant. This loss is expected to cause no additional impact on the functioning of the wastewater treatment plant. The caretaker force would provide a minimal wastewater flow to the treatment plant.

**Solid Waste.** England AFB generates approximately 1,200 cubic yards per month of residential and commercial waste. Because this quantity is about 3 percent of the total monthly average received by the landfill, the closure would have a minimal effect on the Alexandria landfill. The Alexandria landfill is scheduled to close in September 1990. A new landfill site has not yet been selected.

**Energy.** Base closure would reduce electrical power use by approximately 40 million kWh per year, or 5 percent of the volume provided by the Central Louisiana Electrical Companies (CLECO), within Rapides Parish. Residential units vacated as a result of outmigration resulting from base closure would reduce electric power consumption by an additional 39 million kWh per year (5%). This decrease would not affect CLECO's ability to generate or distribute electrical power. The caretaker force would require electrical service to maintain the base.

Because caretaker activities would continue at the base, total gas consumption would not be terminated. However, the base closure would result in an approximate loss of 104 million cubic feet per year, or about 4 percent of the total produced by the City of Alexandria. Offbase residential units vacated due to base closure would also reduce natural gas consumption by an additional minor amount. This loss would not have a minimal effect on the City of Alexandria's gas distribution system.

#### **4.3.2 Hazardous Materials/Waste Management**

##### **4.3.2.1 Hazardous Materials Management**

With base closure, hazardous materials used and stored at Base Supply, and at the industrial facilities throughout the base, would be shipped and used elsewhere or sold as excess in accordance with applicable federal and state regulations. Hazardous materials collected during the base closure process would be disposed of through the England AFB DRMO, Building 2532. A small amount of hazardous materials such as gasoline, oils, herbicides, and pesticides would continue to be stored and used onbase for maintenance of the base facilities during the caretaker period. A minor beneficial impact to public health, water resources, soils, and biological resources would result due to the inventory reduction and related reduced potential for spills, and limited use of hazardous materials on the base after closure.

**Aboveground and Underground Storage Tanks.** Most of the aboveground storage tanks and associated piping at England AFB would be drained and rendered temporarily out of service. Aboveground tanks necessary for maintenance of the base during caretaker activities would remain in service.

Closure of England AFB would also require that most of the 28 underground storage tanks at the base be taken temporarily out of operation, upgraded, or permanently closed. A limited number of tanks required for caretaker activities would remain in service until final disposition of the base is determined. The 22 regulated USTs onbase would be subject to special provisions. Regulated tanks

taken out of service for more than 3 months but less than 12 months would be drained, but would continue to be subject to the operating requirements under Title 40 CFR 280.31, and the Underground Storage Tank Management Plan for England AFB (April 1989). Tank vent lines would remain open and functioning; all other lines, pumps, manways, and ancillary equipment would be capped and secured.

Tanks taken out of service for more than 12 months must be permanently closed if they do not meet either performance standards in 40 CFR 280.20 for new UST systems or the upgrading requirements in CFR 280.21, except that the spill and overfill equipment requirements would not have to be met. Substandard UST systems (not meeting upgrading requirements) must be permanently closed at the end of the 12-month period in accordance with Title 40 CFR 280.71-280.74. Before an extension can be applied for, a site assessment in accordance with CFR 280.72 must be completed. Underground tanks permanently closed would be emptied and cleaned by removing all liquids and accumulated sludges, and either removed from the ground or filled with an inert solid material, according to 40 CFR 280.71(b).

Reduced usage of most of the aboveground and underground storage tanks at England AFB is expected to have a minor beneficial impact on the environment by reducing the potential for future spills or leaks to contaminate soils and water resources.

**Pesticides/Herbicides.** Chemicals used to control pest infestations and ground foliage would be necessary for maintenance activities on the base during the caretaker period. However, the amount of pesticides and herbicides stored and used during this period would be much smaller than that for normal operation of the base. Chemicals determined to be unnecessary for caretaker maintenance activities would be disposed of through the DRMO.

**Other Hazardous Materials.** All other hazardous materials, such as acids, compressed gases, and solvents not needed for maintenance of the base until final disposition is determined, would be shipped and used elsewhere or sold as excess in accordance with applicable federal and state regulations through the DRMO.

#### **4.3.2.2 Hazardous Waste Management**

Closure of England AFB would eliminate the approximately 8,500 pounds of hazardous waste currently generated by the base per month. Base closure would also eliminate the need for and operation of the four hazardous waste accumulation points and the two TSD facilities. The Hazardous Waste Management Plan (April 1988) for England AFB and applicable State of Louisiana-implemented RCRA regulations would continue to be enforced during base drawdown. Hazardous wastes collected during the base closure process would be disposed of through the England AFB DRMO.

**Treatment, Storage, and Disposal Facilities.** The DRMO Storage Facility, Building 2532, and the Explosive Ordnance Disposal (EOD) Range, which are TSD facilities regulated by 40 CFR 265, would be closed in accordance with the approved Closure Plan and Post-Closure Plan for those facilities. The Closure Plan for the TSD facilities briefly describes the facilities, procedures for removing all waste inventory and decontamination of the facility, closure certification procedures, and post-closure contact. The reduction of current hazardous waste disposal activities and the potential for spills would result in a minor beneficial impact on public health, water and biological resources, and soils.

#### **4.3.2.3 Installation Restoration Program Sites**

Activities to remediate past contamination sites identified in the England AFB IRP will continue. IRP remedial investigation/feasibility studies (and subsequent remedial actions) are independent of the base closure process and will continue until remediation is complete. Implementation of the plan for

closure of the storage tank spill site approved by the Louisiana Department of Environmental Quality will have a positive impact on the base. Development or reuse of those sites for which continued monitoring and/or feasibility studies have been recommended may be restricted until any required remedial actions have been completed or the site is determined to require no further action.

#### **4.3.2.4 Asbestos**

The extent and condition of asbestos at England AFB must be identified to determine the impacts from base closure. An asbestos survey is underway and will be completed prior to closure. Any asbestos found will be handled in accordance with the Air Force Policy on management of asbestos at bases for which the General Services Administration is the disposal agent (see Appendix D).

#### **4.3.2.5 Polychlorinated Biphenyls**

No PCB-contaminated equipment or PCB equipment is located on England AFB; therefore, base closure would not have any expected effects.

#### **4.3.2.6 Radon**

The Initial Screening Survey results of the Radon Assessment and Mitigation Program indicated average annual radon concentrations of less than 2.9 picoCuries per liter (pCi/l) for sampled England AFB structures. Radon concentrations of less than 4 pCi/l pose no significant health risk. Therefore, no effects are expected from base closure.

#### **4.3.2.7 Radioactive Waste**

The low-level radioactive waste buried at the radioactive disposal site at England AFB would be transported and disposed of in compliance with local, state, and federal regulations as administered by the Nuclear Regulatory Commission under 10 CFR 20 and the EPA under 40 CFR 191. The low-level radioactive waste material would be removed and transported to a permitted disposal facility. Currently, there are three low-level waste disposal sites: Barnwell, South Carolina; Beatty, Nevada; and Richland, Washington. Minimal effects would occur from removal activities.

#### **4.3.2.8 Ordnance**

With base closure, all ordnance would be removed from the base in accordance with state and federal regulations, and the related hazards would be removed.

### **4.3.3 Natural Environment**

#### **4.3.3.1 Geology and Soils**

**Geology.** Withdrawal of personnel, equipment, and supplies from England AFB would have no effect on the geology of the area. Additionally, because the federal government would retain ownership and mineral rights, there would be no effect on the availability of mineral resources which may be considered commercially valuable.

**Soils.** Base closure may have a positive impact to base soils because of the elimination of military construction (grading, excavation, erosion, other topsoil disturbances). The risk of new soil contamination from spills and/or accidental releases of hazardous materials caused by military operations would also be reduced substantially. Those soils contaminated by previous military activities would continue to be remediated under the IRP (see Section 4.3.2.3).

#### 4.3.3.2 Water Resources

**Groundwater.** Base closure and outmigration resulting from base closure would reduce groundwater use in the Alexandria area by approximately 730 million gallons per year (9%). This would have a minor beneficial impact on the local groundwater resource.

**Surface Water.** Surface water quality would improve with the closure of England AFB. The potential for nonpoint source surface water contamination from normal base operations, roadway runoff, and construction activities would be reduced. In addition, the chance of an accidental spill of hazardous materials would no longer exist. Closure of the base would also reduce by about 13.6 percent the amount of wastewater discharging into the City of Alexandria wastewater collection system, thus decreasing the amount of final effluent discharging into the Red River. This would have a beneficial impact on water quality near the point of discharge.

#### 4.3.3.3 Air Quality

Closing England AFB would produce short-term adverse air quality impacts as a result of emissions from transport vehicles hauling personal and household belongings, equipment, and materials from the base. The expected increase in transport vehicle emissions as a result of the proposed action would be offset by the concurrent decrease in emissions because of a reduction in normal base operations. Pollutant emissions from the transport trucks would be less than 1 percent of the pollutant emissions decrease resulting from the reduction in base operations.

Table 4.3.3-1 presents the pollutant emission reduction that would occur when base closure is complete. The table also shows the percent reduction in Rapides Parish emissions as a result of base closure. Overall, the decrease in pollutant emissions results in about a 1 percent reduction in the Rapides Parish pollution burden. Although this reduction in pollutant emission would be minor, it would improve air quality in the parish.

**Table 4.3.3-1**  
**Changes in Air Pollutant Emissions**  
**Resulting from England AFB Closure**  
**(tons per year)**

Emission Source	Particulates	SO <sub>x</sub>	NO <sub>x</sub>	HC	CO
England AFB Reduction <sup>1</sup>	20.94	13.44	89.50	253.55	667.08
Rapides Parish	15,943	21,279	47,140	8,805	30,244
Percent Reduction in Parish Emissions	0.13	0.06	0.19	2.88	2.21

Notes: <sup>1</sup>Assumes 90 percent reduction in base emissions (see Table 3.3.3-3).

#### 4.3.3.4 Noise

The closure of England AFB would eliminate aircraft operations and the noise resulting from these activities. However, residual background noise levels due to vehicular traffic and caretaker activities would remain on the base. The net reduction of  $L_{dn}$  noise levels on the base would be 10 dB to 25 dB, assuming a background noise level of 55 dB. The sensitive receptors offbase (a school, a church, and approximately 160 residents) northwest of the 14-32 runway would experience reductions of 10 dB to 20 dB from present  $L_{dn}$  noise levels. These noise level reductions would be beneficial to these areas.

Short-term traffic noise on Louisiana Highways 1 and 28 would increase because of the additional truck traffic resulting from transporting personal and household belongings, equipment, and materials from the base during closure. However, calculations using the Federal Highway Administration noise model STAMINA indicates that the increase would be less than 1 dB. This increase would also be offset by the concurrent decrease in noise levels resulting from a decrease in base-related traffic as normal base operations are reduced. STAMINA model calculations indicate that the net decrease in  $L_{dn}$  noise levels, after the base closure is complete, would be 1 dB to 2 dB on Highways 1 and 28. These small reductions in highway noise levels would not be discernible. The highway noise impacts, therefore, would be minimal.

#### 4.3.3.5 Biological Resources

**Vegetation.** After base closure, a minimal maintenance plan would be implemented to maintain base facilities until they are reused. This maintenance plan would include continued lawn mowing in residential and base operations areas and hay cropping in areas near the runways. Therefore, plant communities over the majority of the base would remain essentially constant following base closure, with the possible exception of areas that are currently not maintained and/or would no longer be used in the same manner, such as some of the recreation areas. These areas may be allowed to undergo natural succession and become more vegetatively diverse and dominated by native tree, shrub, and herb species. Over an extensive, undisturbed period (several decades), these areas would revert to a natural forest habitat typical for the region.

**Wildlife.** The withdrawal of military personnel and operations would have a positive impact on wildlife at the base. Although certain aspects of the Wildlife Management Plan that would augment the habitat in selected areas of the base may not be implemented before closure, the reversion of some areas to a more natural habitat and the lack of human activity would increase the quality of the habitat, especially for animals less tolerant of humans.

**Wetlands.** Base closure would have a minimal impact on wetlands, as no direct disturbance would result from the action. Some minor vegetative changes may occur via natural succession, particularly along drainageways where herbicides are currently used. These areas would probably be inhabited by native aquatic plants, possibly augmenting their functional qualities, especially wildlife habitat and water purification qualities. Otherwise, if aquatic habitat improvements proposed in the Fish and Wildlife Management Plan are not implemented, the wetlands on the base would remain essentially unchanged.

**Threatened and Endangered Species.** No threatened or endangered species have been identified on the base and therefore no adverse impacts are expected from closure. If any such species do occur on the base, closure would have essentially no potential to cause impacts because no disruption of habitat or new disturbance of biota would result. During the closure period, disturbance of any protected animals, and the potential for loss of any protected plants or animal habitat, would be reduced from current levels.

#### **4.3.3.6 Cultural and Paleontological Resources**

**Prehistoric Resources.** The Louisiana State Historic Preservation Officer (SHPO) has concurred with a finding that no NRHP-eligible prehistoric sites occur on England AFB. Therefore, base closure would have no impact on prehistoric resources.

**Historic Resources.** The Louisiana SHPO has concurred with a finding that no NRHP-eligible historic structures are present at England AFB. Native American resources have not been identified on the base, but would most likely not be affected by base closure activities. Therefore, base closure would have no impact on historic resources.

**Paleontological Resources.** Paleontological resources which may occur in alluvium at England AFB would not be considered scientifically important; therefore, base closure activities would not affect important paleontological resources.

#### **4.3.4 Potential Mitigation Measures**

The caretaker team would maintain buildings, grounds, and water supply/utility systems, and would provide adequate security. This would further reduce any potential environmental impacts until the final disposition of the property.

#### **4.3.5 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment**

The overall impacts to the environment from the closure of Myrtle Beach AFB would be beneficial in the short term. The long-term impacts are unknown because the future uses of the base have not been determined.

#### **4.5 Irreversible and Irretrievable Commitment of Resources**

The resources irreversibly and irretrievably committed in the proposed base closure or closures and realignment of units would be minimal. Some energy resources would be expended in moving realigned units and there would be some minor construction at the receiving bases to accommodate these units. Base closures would generally reduce the commitment of resources to defense programs.

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## CONSULTATION AND COORDINATION

The federal, state, and local agencies and private organizations/agencies that were contacted during the course of preparing this Environmental Impact Statement are listed below.

### Myrtle Beach Air Force Base, South Carolina

- U.S. Fish and Wildlife Service, Regional Director, Atlanta, Georgia  
(James W. Pulliam, Jr.)
- South Carolina Department of Marine and Wildlife Resources, Columbia, South Carolina (Dr. James Timmerman, Jr.)
- South Carolina Fish and Wildlife Service, District Office, Charleston, South Carolina  
(Steve Gilbert)
- South Carolina Department of Archives and History, Columbia, South Carolina  
(Dr. George L. Vogt, State Historic Preservation Officer)
- South Carolina Department of Highways and Public Transportation, Conway, South Carolina
- South Carolina Water Resources Commission, Columbia, South Carolina
- South Carolina Coastal Council, Charleston, South Carolina
- South Carolina Coastal Council, Columbia, South Carolina (Dr. H. Wayne Beam)
- Grand Strand Water and Sewer Authority, Conway, South Carolina (Larry Schwarz)
- Horry County Department of Public Works, Horry County Sanitation District, South Carolina (Phillip Barnhill)
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## 7.0 REFERENCES

### 7.1 GENERAL REFERENCES

Bolt, Beranek, and Newman, Inc.

1973 *Fundamentals and Abatement of Highway Traffic Noise*. Canoga Park, California.

#### Code of Federal Regulations

1978 *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. Council on Environmental Quality, 40 CFR 1500-1508, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

1987a *National Primary Drinking Water Regulations*. U.S. Environmental Protection Agency, 40 CFR 141, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

1987b *National Register of Historic Places; Criteria for Evaluation*. U.S. Department of the Interior, 36 CFR 60.4, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

1987c *National Secondary Drinking Water Regulations*. U.S. Environmental Protection Agency, 40 CFR 143, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

#### Engineering-Science

1981 *Installation Restoration Program, Phase I: Myrtle Beach AFB*. Atlanta, Georgia. Prepared for U.S. Air Force, AFESC/DEV, Tyndall AFB, Florida.

#### Federal Interagency Committee for Wetland Delineation.

1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Services, and U.S. Department of Agriculture Soil Conservation Service, Washington, DC. Cooperative technical publication.

#### Transportation Research Board

1978 *Quick-Response Urban Travel Estimation Techniques and Transferable Parameters User's Guide*. National Cooperative Highway Research Program, Report 187, National Research Council, Washington, DC.

1985 *Highway Capacity Manual Special Report 200*. National Research Council, Washington, DC.

#### U.S. Bureau of the Census

1988 *County and City Data Book*. U.S. Government Printing Office, Washington, DC.

#### U.S. Environmental Protection Agency

1971 *Community Noise*. Wylie Laboratories, Washington, DC.

1985 *Compilation of Air Pollutant Emission Factors, AP-42 Emissions*. Vols. I and II, 4th edition. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

U.S. Fish and Wildlife Service

1984 *Endangered and Threatened Species on U.S. Air Force Installations*. Washington, DC.

1985a *Endangered and Threatened Wildlife and Plants; Review of Vertebrate Wildlife; Notice of Review*, *Federal Register* 50 (181):37958-37959, Washington, DC.

1985b *Endangered and Threatened Wildlife and Plants; Review of Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review*, *Federal Register* 50 (188):39526-39527, Washington, DC.

7.2 MYRTLE BEACH AIR FORCE BASE, SOUTH CAROLINA

American Ornithologists' Union

1983 *Checklist of North American Birds*. 6th ed. Allen Press, Inc., Lawrence, Kansas.

Beckett, T.

1971 *A Summary of Red-Cockaded Woodpecker Observations in South Carolina*. In *Ecology and Management of the Red-Cockaded Woodpecker*. Edited by R.L. Thompson. Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, and Tall Timbers Research Station, Tallahassee, Florida.

Carolina Archaeological Services

1980 *A Cultural Resources Inventory of Myrtle Beach Air Force Base, Myrtle Beach, South Carolina*.

Carson, Wayne T.

1989-1994 *Land Management Plan for Myrtle Beach AFB, South Carolina*.

Center for Environmental Measurements, Research Triangle Institute

1985a *Installation Restoration Program Phase II, Problem Confirmation and Quantification, Myrtle Beach AFB, South Carolina*. Volume I.

1985b *Installation Restoration Program, Phase II, Problem Confirmation and Quantification, Myrtle Beach AFB, South Carolina*. Volume II.

Chura, N.J., and P.A. Stewart

1967 *Care, Food Consumption, and Behavior of Bald Eagles Used in DDT Tests*. *Wilson Bull.* 79:441-448.

Conant, R.

1975 *A Field Guide to Reptiles and Amphibians of Eastern and Central North America*. Houghton Mifflin Co., Boston.

Coon, N.C., L.N. Locke, E. Cromartie, and W.L. Reichel

1970 *Causes of Bald Eagle Mortality, 1960-1965*. *J. Wildl. Diseases* 6:72-76.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe

1979 *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. Fish and Wildlife Service, U.S. Department of the Interior. Washington DC.

Craig, G.

1986 *Peregrine Falcon*. In *Audubon Wildlife Report 1986*. Edited by R.L. DeSilvestro. The National Audubon Society, New York.

- Dara, Tina M.  
 1987-88 *Water Pollution Emissions Inventory and Monitoring Summary for CY 1987-88*.  
 1988 *Noise Pollution Inventory for CY 1988*.  
 1989 *354 Medical Group (TAC), Myrtle Beach AFB, South Carolina, Air Pollution Emissions Inventory for CY88*.
- Environmental Resources Management, Inc.  
 1990 *Installation Restoration Program, Long Term Monitoring State 1, Remedial Investigation. Volume I. Exton, Pennsylvania*.
- Federal Interagency Committee for Wetland Delineation  
 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Department of Agriculture, Soil Conservation Service, Washington, DC. Cooperative technical publication.
- Goddrey, R.K., and J.W. Wooten  
 1979 *Aquatic and Wetland Plants of Southeastern United States, Monocotyledons*. University of Georgia Press, Athens.  
 1981 *Aquatic and Wetland Plants of Southeastern United States, Dicotyledons*. University of Georgia Press, Athens.
- Grier, J.W.  
 1982 Ban of DDT and Subsequent Recovery of Reproduction in Bald Eagles. *Science* 218:1232-1235.
- Griscom, L., and A. Sprint, Jr.  
 1979 *The Warblers of America*. Doubleday and Company, Garden City, New York.
- Groombridge, B. (compiler)  
 1982 *The IUCN Amphibia-Reptilia Red Data Book, Part I, Testudines, Crocodylia, and Rhynchocephalia*. IYCN, Gland, Switzerland.
- Haig, S.M., and L.W. Oring  
 1987 The Piping Plover. In *Audubon Wildlife Report: 1987*. Edited by R.L. DeSilvestro. Academic Press, Boston.
- Harris, Miller  
 1989 *Environmental Assessment of Proposed Changes in the Joint Use Agreement for the Myrtle Beach Jetport*. Miller & Hanson, Inc.
- Harrison, H.H.  
 1984 *Wood Warblers' World*. Simon and Schuster, New York.
- Hartman, D.S.  
 1979 Ecology and Behavior of the Manatee (*Trichechus manatus*) in Florida. *American Soc. Mammal. Special Publication No. 5*.
- Hazardous Materials Technical Center  
 1988a *Hazardous Waste Management Plan, Myrtle Beach AFB, South Carolina*. Rockville, Maryland.

- 1988b *Hazardous Waste Management Survey, Myrtle Beach AFB, South Carolina*. Rockville, Maryland.
- Jackson, J.A.  
1987 *The Red-Cockaded Woodpecker*. In *Audubon Wildlife Report: 1987*. Edited by R.L. DeSilvestro, Academic Press, Boston.
- Law Environmental, Inc.  
1989 *Corrective Action Plan (CAP) for BX Service Station, Myrtle Beach AFB*. Kenneshaw, Georgia.
- Laycock, G.  
1973 *Autumn of the Eagle*. Scribners, New York.
- Lazell, J.D.  
1980 *New England Waters: Critical Habitat for Marine Turtles*. *Copeia* 2:290-295.
- LBC & W Consultants - Planning, Research, Management, Inc. and Wilbur Smith and Associates  
1979 *Comprehensive Plan for the Myrtle Beach Area*.
- Leary, T.R.  
1957 *A Schooling of Leatherback Turtles, Dermochelya Coriacea Coriacea, On the Texas Coast*. *Copeia* 3:232.
- Lofgren, Steven T.  
1985-1990 *Outdoor Recreation Plan for Myrtle Beach AFB, South Carolina*. Revised by Gregory J. Grindinger.
- The LPA Group, Inc. and Myrtle Beach AFB, South Carolina  
1989 *Environmental Assessment for Amendment of the Joint Use Agreement on Myrtle Beach AFB, South Carolina*. Columbia, South Carolina and Environmental and Contract Planning Section, Myrtle Beach, South Carolina.
- 1990 *Myrtle Beach Jetport Contingency Plan for 1990 Airport Revenue Bond Issue*. Columbia, South Carolina and Environmental and Contract Planning Section, Myrtle Beach AFB, South Carolina.
- Mager, A., Jr.  
1985 *Five-Year Status Reviews of Sea Turtles Listed Under the Endangered Species Act of 1973*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, St. Petersburg, Florida.
- Manci, K.M., D.N. Gladwin, R. Villella, and M.G. Cavendish  
1988 *Effects of Aircraft Noise and Sonic Booms on Domestic Animals and Wildlife: A Literature Synthesis*. U.S. Fish and Wildlife Service, National Ecology Research Center, Fort Collins, Colorado. NERC-88/29.
- Martof, B.S., W.M. Palmer, J.R. Bailey, and J.R. Harrison III  
1980 *Amphibians and Reptiles of the Carolinas and Virginia*, UNC Press, Chapel Hill.
- McDiarmid, R.W. (editor)  
1978 *Rare and Endangered Biota of Florida, Vol. 3, Amphibians and Reptiles*. University Presses of Florida, Gainesville.

- Myrtle Beach, City of  
1989 *Zoning Ordinance*. City of Myrtle Beach, South Carolina.
- National Geographic Society  
1987 *Field Guide to the Birds of North America*, 2 ed. W.A. Krueger Company, New Berlin, Wisconsin.
- Nelson, J.B.  
1986 *The Natural Communities of South Carolina: Initial Classification and Description*. South Carolina Wildlife and Marine Resources Department, Division of Wildlife and Freshwater Fisheries.
- Peterson, R.T.  
1980 *A Field Guide to the Birds of Eastern and Central North America*. Houghton Mifflin Co., Boston.
- Potter, E.F., J.F. Parnell, and R.P. Teulings  
1980 *Birds of the Carolinas*. UNC Press, Chapel Hill.
- Radford, A.E., H.E. Ahles, and C.R. Bell  
1968 *Manual of the Vascular Flora of the Carolinas*. UNC Press, Chapel Hill.
- Rebel, T.P.  
1974 *Sea Turtles and the Turtle Industry of the West Indies, Florida, and the Gulf of Mexico*. University of Miami Press, Coral Gables.
- Soil Conservation Service  
1986 *Soil Survey of Horry County, South Carolina*. U.S. Department of Agriculture.  
1987 *Hydric Soils of the United States*. U.S. Department of Agriculture.
- South Carolina, State of  
1982 *Horry County Airport Safety Zoning Ordinance for Myrtle Beach AFB*. Horry County Council.  
1988 *Permit to Use Ground Water*. Water Resources Commission.  
1990a *Average Daily Traffic Counts and Capacity Counts*. Department of Highways and Public Transportation.  
1990b *Water Use Report*. Water Resources Commission, Water Use Section.
- Spendelow, J.A., and S.R. Patton  
1988 *National Atlas of Coastal Waterbird Colonies in the Contiguous United States: 1976-1982*. U.S. Fish and Wildlife Service Bio Report 88(5).
- Sutter, R.D., V. Frantz, and K.A. McCarthy  
1987 *Atlas of Rare and Endangered Plant Species in North Carolina*. North Carolina Department of Agriculture, Plant Conservation Program, Plant Protection Section, Raleigh.
- Terres, J.K.  
1987 *The Audubon Society Encyclopedia of North American Birds*. Alfred A. Knopf, New York.

Timbes/Wilund/Usry/Carger/Architects, Incorporated with the LPA Group, Inc.  
1988 *Terminal Area Study, Myrtle Beach Jetport.*

Tiner, R.W., Jr.  
1984 *Wetlands of the United States: Current Status and Recent Trends.* Fish and Wildlife Service, U.S. Department of the Interior, Washington, DC.

U.S. Army Corps of Engineers  
1985 *Forest Management Plan for Myrtle Beach AFB, Myrtle Beach, South Carolina.* Savannah District.

U.S. Air Force  
1976 *Air Installation Compatible Use Zones for Myrtle Beach Air Force Base.*  
  
1977 *Environmental Narrative, Myrtle Beach AFB, Myrtle Beach, South Carolina.*  
  
1983 *Real Property Study, Myrtle Beach AFB, South Carolina.* 354th Civil Engineering Squadron Real Estate Section, Myrtle Beach AFB, South Carolina.  
  
1987a *Commanders Long Range Facility Improvement Plan, Myrtle Beach AFB.* Headquarters 354th Tactical Fighter Wing (TAC), Myrtle Beach.  
  
1987b *354th Tactical Fighter Wing, Spill Prevention and Response Plan.* 354th Tactical Fighter Wing, Myrtle Beach AFB, South Carolina.  
  
1988 *Aircraft Traffic History (1988 Calendar Year).* Headquarters 354th Combat Support Group (TAC), Myrtle Beach, South Carolina.  
  
1989 *Air Traffic History.* Headquarters 354th Combat Squadron Group (TAC), Myrtle Beach, South Carolina.  
  
1990a *Myrtle Beach AFB Flight Patterns.*  
  
1990b *USAF Real Property Inventory Detail List.*

U.S. Department of the Interior  
1978-1992 *Fish and Wildlife Management Plan for Myrtle Beach AFB.*

Webster, W.D., J.F. Parnell, and W.C. Biggs, Jr.  
1985 *Mammals of the Carolinas, Virginia, and Maryland.* UNC Press, Chapel Hill.

### 7.3 DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

Altschul, Jeffrey H.  
1988 *Life Away From the River: A Cultural Resources Class II Survey of Davis-Monthan Air Force Base, Tucson, Arizona.* Report prepared for the Los Angeles District, U.S. Army Corps of Engineers.

CH2M Hill  
1982 *Installation Restoration Program Records Search for Davis-Monthan Air Force Base, Arizona.* Prepared for Air Force Engineering and Services Center Directorate of Environmental Planning Tyndall AFB, Florida and Tactical Air Command Directorate of Engineering and Construction, Langley AFB, Virginia.

Cooley, M.E. (compiler)

1973 *Map Showing Distribution and Estimated Thickness of Alluvial Deposits in the Tucson Area, Arizona*. U.S. Geological Survey Map I - 844C. Scale 1:250,000

Dames and Moore

1985 *Installation Restoration Program Phase I - Confirmation/Quantification Stage I Report, Davis-Monthan AFB, Arizona*. Prepared for U.S. Air Force Occupational and Environmental Health Laboratory (OEHL), Brooks AFB, Texas.

Davis-Monthan Air Force Base, Arizona

1975 *Air Installation Compatible Use Zone (AICUZ)*. Davis-Monthan AFB, Arizona.

1983 *Existing Zoning, Land Use, and Major Areas of Incompatibility*. Davis-Monthan AFB, Arizona.

1986 *Fish and Wildlife Plan*. Davis-Monthan AFB, Arizona.

1986 *Land Management Plan*. 836th Civil Engineering Squadron, Davis-Monthan AFB, Arizona.

1986 *Water Conservation Program*. 836th Civil Engineering Squadron, Davis-Monthan AFB, Arizona.

1987 *Cornerstone 2000: A Long Range Planning Document*. Davis-Monthan AFB, Arizona.

1987 *Solvent Management Plan*. Davis-Monthan AFB, Arizona.

1989 *Air Emission Inventory*. Davis-Monthan AFB, Arizona.

1989 *D-M*. MARCOA Publishing, Inc., San Diego, California.

1989 *Spill Prevention and Response Plan*. Davis-Monthan AFB, Arizona.

1989 *Water Pollution Inventory and Monitoring Summary*. Davis-Monthan AFB, Arizona.  
83rd AD Hosp/SGPB, Davis-Monthan AFB, Arizona.

1990 *Air Emission Permits*. Davis-Monthan AFB, Arizona.

1990 *Environmental Compliance Assessment and Management Program*. 836th Civil Engineering Squadron, Davis-Monthan AFB, Arizona.

1990 *Environmental Issues and Resolutions*. 836th Civil Engineering Squadron, Davis-Monthan AFB, Arizona

1990 *Fiscal Year 1989 Economic Resource Impact Statement*. Cost Analysis Branch, Davis-Monthan AFB, Arizona. U.S. Government Printing Office.

ENTEC, Inc.

1989 *Underground Storage Tank Management Plan, Davis-Monthan AFB, Arizona*. Prepared for 836th Combat Support Group/CC Davis-Monthan AFB, Arizona.

1989 *Waste Minimization Guide, Davis-Monthan AFB*. Prepared for 836th CSG/DEQ, Davis-Monthan AFB, Arizona.

1990 *Hazardous Waste Management Plan, Davis-Monthan Air Force Base, Arizona*. Prepared for 836th CSG/DEQ Davis-Monthan AFB, Arizona.

Intrasearch (Denver)

n.d. *Geology of the Tucson Quadrangle 1°x 2° geologic map prepared for the U.S. Department of Energy*. U.S. Geological Survey Open File Report T5-336 GE-233. Scale: 1:250,000.

James M. Montgomery, Consulting Engineers, Inc.

1990 *Installation Restoration Program Advance Draft Investigation Report Davis-Monthan Air Force Base Tucson, Arizona*. Prepared for U.S. Army Corps of Engineers.

KPMG Peat Marwick, Airport Consulting Services

1990 *Volume I: Noise Exposure Maps, FAR Part 150 Noise Compatibility Program Update, Tucson International Airport*. Prepared for Tucson Airport Authority.

Legendre, Captain Paul J., BSC

1988 *Air Pollution Emission Inventory for CY 1988*. Davis-Monthan AFB, Arizona.

MacFall, R.P. and J.C. Wollin

1972 *Fossils for Amateurs; A Handbook for Collectors*. Van Nostrand Reinhold, New York.

Peat Marwick Main & Co., Airport Consulting Services

1987 *Tucson International Airport Summary Master Plan Update*. Tucson Airport Authority.

Peat, Marwick, Mitchell & Co.

1982 *Summary Airport Environs Plan, Tucson International Airport, Tucson, Arizona*. City of Tucson Planning Department, Pima County Planning and Zoning Department, Tucson Airport Authority.

Pima County Department of Environmental Quality

1989 *Annual Data Summary, Air Quality in Tucson, Arizona, 1988*. Pima County Air Quality Control District, Tucson, Arizona.

Southwest Gas Corporation

1990 *1989 Annual Report*. Las Vegas, Nevada.

Sumner, Davis M.

1989 *Outdoor Recreation Plan for Davis-Monthan Air Force Base*.

Tucson, City of, Planning Department

1984 *South Pantano Area Plan*. Resolution Number 12941 (Adoption).

1986 *Arroyo Chico Area Plan*. Resolution Number 13487 (Adoption).

1986 *Esmond Station Area Plan*. Resolution Number 13563.

Tucson Economic Development Corporation

1990 *Community Audit for the Metropolitan Tucson, Arizona Area Winter 1990*.

Tucson Electric Power Company

1990 *1989 Annual Report*. Tucson, Arizona.

- U.S. Air Force  
1989 *Air Installation Compatible Use Zone Report, Davis-Monthan Air Force Base, Arizona.*
- U.S. Army Construction Engineering Research Laboratory  
1978 *Predicting Noise Impact in the Vicinity of Small-Arms Ranges, Interim Report N-61.*
- U.S. Environmental Protection Agency  
1974 *Information on Levels of Environment Noise Requisites to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA Report 550/9/74-004.*  
  
1988 *Pima County, Arizona, Air Emission Inventory; National Emissions Data System, Region IX, San Francisco, CA.*
- U.S. Federal Highway Administration  
1982 *Noise Barrier Cost Reduction Procedures STEIMINA 2.0/OPTIMA User's Manual, Arlington, VA.*
- Valley National Bank  
1989 *Arizona Statistical Review.*
- Wilson, E.D., R.T. More, and J.R. Cooper  
1969 *Geologic Map of Arizona. U.S. Geological Survey. Scale: 1:500,000.*

#### 7.4 ENGLAND AIR FORCE BASE, LOUISIANA

- Alexandria, City of, and Rapides Parish Police Jury  
n.d. *Public Hearing Response and Policy Paper (AICUZ, Land Use, and Population).*
- Coleman, J.M. and W.G. Smith  
1964 *Late Recent Rise of Sea Level. Geological Society of America Bulletin 75:833-840*
- Commonwealth Associates, Inc.  
1982 *Cultural Resources Survey of the Red River Waterway From Shreveport to the Mississippi River. Prepared for the New Orleans District Corps of Engineers, Department of the Army. J.A. Newkirk and J.W. Mueller, Principal Investigators. Jackson, Michigan.*
- Dynamac Corporation  
1988 *Hazardous Waste Management Plan, England Air Force Base, Louisiana, Final Report.*  
  
1988 *Underground Storage Tank Management Plan, England AFB, Louisiana.*
- England Air Force Base, Louisiana  
1978 *Amendment to Environmental Assessment, Jena Military Operating Area (MOA).*  
  
1990a *Airspace Utilization Data Survey.*  
  
1990b *England 2000 Comprehensive Plan/Yearly Report.*

- 1990c *Environmental Enforcement Status Report.*
- 1990d *Underground Storage Tank Inventory.*
- Federal Aviation Administration  
1990 *Houston Sectional Aeronautical Chart.*
- Haag, W.G.  
1971 *Louisiana in North American Prehistory.* Museum of Geoscience, Louisiana State University, Baton Rouge.
- Kniffen, Fred B., Hiram F. Gregory, and George A. Stokes  
1987 *The Historic Tribes of Louisiana from 1542 to the Present.* Louisiana State University Press, Baton Rouge.
- Loftin, A.A.  
1985 *Grazing and Cropland Management Plan for England Air Force Base, Louisiana.*
- Military Traffic Management Command  
1979 *Traffic Engineering Study, England AFB, Louisiana.* MTMC Report TE 79-2C-26.
- Neuman, Robert W.  
1984 *An Introduction to Louisiana Archaeology.* Louisiana State University Press, Baton Rouge.
- Noble, R.E.  
1986 *Fish and Wildlife Management Plan for England Air Force Base, Louisiana.*
- PRC Environmental Management, Inc.  
1990 *RCRA Facility Assessment Report, England AFB, Louisiana.*
- Radion Corporation  
1985 *Installation Restoration Program Phase II - Confirmation/Quantification, Stage I. Final Report for England AFB, Louisiana.* Prepared for U.S. Air Force Occupational and Environmental Health Laboratory (OEHL), Brooks AFB, Texas.
- Rapides Parish Police Jury  
1989 *Air Base Landing District Ordinance.*
- Rolka, Tom  
1990 *Air Pollution Emissions Inventory for CY1989; 23rd Medical Group (TAC) Hospital, England AFB, Louisiana.*
- Stephens, Bruce  
1988 *Land Management Plan for England Air Force Base, Louisiana.*
- U.S. Department of Agriculture, Soil Conservation Service and Forest Service  
1980 *Soil Survey of Rapides Parish, Louisiana.*
- U.S. Department of Defense  
1990 *DOD-IFR Supplement for United States.*

U.S. Air Force

n.d. *Mid-Air Collision Avoidance Program, England AFB, Louisiana.*

1983 *Phase I Records Search, Installation Restoration Program, England AFB.* Directorate of Engineering and Environmental Planning, Langley AFB, Virginia.

Walk, Haydell, and Associates, Inc.

1989a *Final Installation Restoration Program Remedial Investigation. Remedial Investigation Report England AFB, Louisiana, Five Training/Drum Storage Site No. 1.* Prepared for Headquarters Tactical Air Command, HQ TAC/DEEV, Langley Air Force Base, Virginia.

1989b *Final Installation Restoration Program Remedial Investigation. Remedial Investigation Report England AFB, Louisiana, Volume 1.* Prepared for Headquarters, Tactical Air Command, HQ TAC/DEEV, Langley AFB, Virginia.

Wright, Muriel H.

1986 *A Guide to the Indian Tribes of Oklahoma.* University of Oklahoma Press, Norman.

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## APPENDIX A - GLOSSARY OF TERMS AND ACRONYMS

### TERMS

***Accident Potential Zones (APZ).*** Areas immediately beyond the ends of Department of Defense fixed-wing runways that have a higher potential for aircraft accidents than other areas. Specifically, APZs fall into two categories: APZ 1 is the area beyond the runway clear zone that possesses a significant potential for accidents, and APZ 2 is an area beyond APZ 1 that has a measurable potential for accidents.

***Active Fault.*** A fault on which movement has occurred during the past 10,000 years and which may be subject to recurring movement usually indicated by small, periodic displacement or seismic activity.

***Advisory Council on Historic Preservation.*** A 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 USC § 470).

***Air Installation Compatible Use Zone.*** A concept developed by the Air Force to promote land use development near its airfields in a manner that protects adjacent communities from noise and safety hazards associated with aircraft operations, and to preserve the operational integrity of the airfields.

***Alluvium.*** A general term applied to sediments deposited by a stream or running water.

***Ambient Air.*** That portion of the atmosphere, outside of buildings, to which the general public has access.

***Ambient Air Quality Standards.*** Standards established on a state or federal level that define the limits for airborne concentrations of designated "criteria" pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone and lead) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

***Aquifer.*** The water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells.

***Archaeology.*** A scientific approach to the study of human ecology, cultural history, and cultural process.

***Arterial.*** Signalized streets with signal spacings of 2 miles or less and turning movements at intersections that usually do not exceed 20 percent of total traffic. Urban arterials primarily serve through-traffic, and, as a secondary function, provide access to abutting properties (urban); roadways that provide large traffic volume capacity between major traffic generators, designed to facilitate traffic movement and discourage land access when feasible. Includes primary state roads (functional).

***Artifact.*** Anything that owes its shape, form, or placement to human activity. In archaeological studies, the term is applied to portable objects (e.g., tools and the by-products of their manufacture).

***Attainment Area.*** An area that has been designated by the Environmental Protection Agency and the appropriate state air quality agency as having ambient air quality levels below the ceiling levels defined under the National Ambient Air Quality Standards.

**Attenuation.** A decrease in the amplitude or energy (intensity) of a seismic wave with distance from the epicenter.

**Average Annual Daily Traffic.** For a 1-year period, the total volume passing a point or segment of a highway facility in both directions, divided by the number of days in the year.

**Bedrock.** Geologic formation or unit which underlies soil or other unconsolidated surficial deposits.

**Bonds.** Financial instruments used by government agencies to fund major capital improvement projects; typically either a general obligation bond or revenue bond.

**Budget.** Document prepared by a government unit which estimates future revenues expected to be collected and the expenditure needs of the jurisdiction in a forthcoming fiscal year or years; includes estimates of potential revenues and expected expenditures by major fund groups (governmental funds, proprietary funds, and fiduciary fund types).

**Capacity (Transportation).** The traffic-carrying ability of a facility while maintaining prescribed operational qualities (e.g., a specific level of service); the maximum amount of traffic that can be accommodated by a given facility. (Note: Traffic facilities generally operate poorly at or near capacity, and facilities are rarely designed or planned to operate within this range.)

**Capacity (Utilities).** The maximum load a system is capable of carrying under existing service conditions.

**Capital Costs.** Expenditures by local governments on physical infrastructure.

**Clear Zone.** The area surrounding a runway where the aircraft accident risk is high enough that necessary land use restrictions would prohibit reasonable economic use of the land.

**Climate.** The prevalent or characteristic meteorological conditions (and their extremes) of any given location or region.

**Comprehensive Plan.** A public document, usually consisting of maps, text, and supporting materials, adopted and approved by a local government legislative body, which describes future land uses, goals, and policies.

**Confined Aquifer.** An aquifer that is overlain by an impermeable stratum and within which water pressure may build up so that penetration by a well will result in a static water level that is considerably higher than the top of the aquifer.

**Corridor.** A strip of land of various widths on both sides of a particular linear facility such as a highway or rail line.

**Cumulative Impacts.** The combined impacts resulting from all programs occurring concurrently at a given location.

**Decibel.** The unit of measurement of sound level calculated by taking ten times the common logarithm of the ratio of the magnitude of the particular sound pressure to the standard reference sound pressure of 20 micropascals and its derivatives.

**Developed.** Said of land, a lot, a parcel, or an area that has been built upon, or where public services have been installed prior to residential or commercial construction.

**Direct Effects.** Effects that are immediate consequences of program activities. In economics, the initial increase in employment and income resulting for program employment and material purchases before the indirect effects of these changes are measured.

**Direct Employment.** Military and civilian personnel who are employed by the Department of Defense and its contractors, and who are working onsite on the program.

**Direct Impact.** Effects resulting solely from program implementation.

**Disturbed Area.** Land that has had its surface altered by grading, digging, or other construction-related activities.

**Effect.** A change in an attribute. Effects can be caused by a variety of events, including those that result from program attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied (indirect effect); those that result from attributes of other programs or other attributes that change because of other programs (cumulative effects); and those that result from natural causes (e.g., seasonal change).

**Effluent.** Wastewater discharge from a wastewater treatment facility.

**Employment.** The total number of persons working (includes all wage and salary workers), both civilian and military, and proprietors.

**Endangered Species.** A species that is threatened with extinction throughout all or a significant portion of its range.

**Energy.** The capacity for doing work; taking a number of forms which may be transformed from one into another, such as thermal, mechanical, electrical, and chemical; in customary units, measured in kilowatt-hours or British thermal units.

**Environmental Impact Analysis Process.** The process of conducting environmental studies as outlined in Air Force Regulation 19-2.

**Expenditure.** A disbursement of funds by a government entity; includes operation and maintenance costs, as well as capital costs.

**Fault.** A fracture or zone of fractures along which there has been movement of the sides relative to one another and parallel to the fracture.

**Fault Zone.** An area or region that is expressed as a zone of numerous fractures or faults.

**Fiscal Year.** In government finance, the 12-month period that corresponds to the jurisdiction's accounting period, typically beginning July 1st and ending June 30th.

**Floodplain.** The relatively flat land lying adjacent to a river channel that is covered by water when the river overflows its banks.

**Fugitive Dust.** Particulate matter composed of soil that is uncontaminated by pollutants from industrial activity. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

**Fugitive Emissions.** Emissions released directly into the atmosphere that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

**Geologic Unit.** A geologic formation, group, or member.

**Group.** A stratigraphic unit consisting of two or more contiguous or associated geologic formations.

**Hazardous Materials.** Both nonradioactive (e.g., missile propellants and diesel fuel) and radioactive materials.

**Hazardous Waste.** A waste, or combination of wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

**Historic.** A period of time after the advent of written history dating to the time first Euro-American contact in an area. Also refers to items primarily of Euro-American manufacture.

**Hydrology.** The science dealing with the properties, distribution, and circulation of water on the surface of the land and in the soil and underlying rocks.

**Impact.** An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique.

**Indirect Employment.** Employment resulting from the purchases of workers who are directly working on a specified program. Also includes any subsequent employment arising from the increase in purchases in the area.

**Indirect Impacts.** Program-related impacts (usually population changes and resulting impacts) not directly attributable to the program itself. For example, direct program employees will spend some of their income locally. As a result, local industries will tend to hire more workers as they expand in response to the increased demand. This additional employment is termed an "indirect impact."

**Interstate.** The designated National System of Interstate and Defense Highways located in both rural and urban areas; they connect the East and West coasts and extend from Canadian border points to various points on the Mexican border.

**Kilowatt.** A unit of power equivalent to 1,000 watts.

**Land Use Plans and Policies.** Guidelines adopted by governments to direct future land use within their jurisdictions.

**$L_{24}$  Noise Level.** The 24-hour average-energy sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 P.M. and 7:00 A.M.

**$L_{eq}$  Noise Level.** A constant amount of acoustic energy equivalent to the energy contained in the time-varying noise measured from a given source for a given time.

**Level of Service.** In transportation analyses, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or passengers. In public services, a measure describing the amount of public services (e.g., fire protection and law enforcement services) available to community residents, generally expressed as the number of personnel providing the services per 1,000 population.

**Long Term.** Impacts that would occur over an extended period of time, whether they start during the construction or operations phase. Most impacts from the operations phase are expected to be long term since program operations essentially represent a steady-state condition (i.e., impacts resulting from actions that occur repeatedly over a long period of time). However, long-term impacts could also be caused by construction activities if a resource is destroyed or irreparably damaged or if the recovery rate of the resource is very slow.

**Megawatt.** One thousand kilowatts or one million watts.

**Mercalli Scale.** An arbitrary scale of earthquake intensity ranging from I for an earthquake detected only by seismographs to XII for one causing total destruction of all buildings.

**Microgram.** One-millionth of a gram.

**Military Operating Area (MOA).** An airspace assignment of defined vertical and lateral dimensions established outside positive control areas to separate or segregate certain military activities from instrument flight rules (IFR) traffic and to identify for visual flight rules (VFR) traffic where these activities are conducted.

**Military Training Route (MTR).** Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots.

**Mitigation.** A method or action to reduce or eliminate program impacts.

**National Register of Historic Places.** A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.

**Native Americans.** Used in a collective sense to refer to individuals, bands or tribes who trace their ancestry to indigenous populations of North America extant to Euro-American contact.

**Native Vegetation.** Plant life that occurs naturally in an area without agricultural or cultivational efforts.

**Net Explosive Weight.** Weight of the explosives exclusive of casings and other protective materials in the munitions.

**Nonattainment Area.** An area that has been designated by the Environmental Protection Agency and the appropriate state air quality agency as exceeding one or more National Ambient Air Quality Standards.

**Paleontological Resources.** Fossilized organic remains from past geological periods.

**Peak Demand.** The highest instantaneous amount of electrical power (in kilowatts) that an electrical system is required to supply over a given time frame, usually 1 year.

**Peak Hour.** The hour of highest traffic volume on a given section of roadway between 7 A.M. and 9 A.M. or between 4 P.M. and 6 P.M.

**Peak Year.** The year when a particular program-related effect is greatest.

**Prehistoric.** The period of time before the written record, and before Europeans entered an area.

**PioCurie.** One trillionth of a curie, the unit used in measuring radioactivity.

**Prime Farmland.** Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture (Farmland Protection Policy Act, 7 CFR § 658).

**Principal Aquifer.** The particular aquifer that supplies the majority of the groundwater used in a given region.

**Recharge.** The process by which water is absorbed and added to the zone of saturation, either directly into a formation or indirectly by way of another formation.

**Restricted Area.** Airspace designated under FAR Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Restricted Areas are designated when determined necessary to confine or segregate activities considered to be hazardous to nonparticipating aircraft.

**Riparian.** Of or relating to land lying immediately adjacent to a water body, and having specific characteristics of that transitional area (e.g., riparian vegetation).

**Runoff.** The noninfiltrating water entering a stream or other conveyance channel shortly after a rainfall event.

**Secondary Employment.** In economics, the additional employment and income generated by the economic activity required to produce the inputs to meet the initial material requirements. The term often is used to include induced effects.

**Seismic.** Pertains to the characteristics of an earthquake or earth vibrations including those that are artificially induced.

**Short Term.** Transitory effects of the proposed program that are of limited duration and are generally caused by construction activities or operations start-up.

**Significance.** The importance of a given impact on a specific resource as defined under the Council on Environmental Quality regulations.

**Soil.** A natural body consisting of layers or horizons of mineral and/or organic constituents of variable thickness and differing from the parent material in their morphological, physical, chemical, and mineralogical properties, and biological characteristics.

**Soil Association.** A collection of soils found to geographically occur together.

**Soil Series.** The lowest category used for differentiating groups of soils based on similar properties and characteristics. Soils are homogenous with respect to profile characteristics except for the A or surface horizon, which may vary in texture.

**Soil Types.** A category or detailed mapping unit used for soil surveys based on phases or changes within a series (e.g., slope, salinity).

**Sole Source Aquifer.** An aquifer that provides all or most of the potable water in an area and that has been specifically designated by the Environmental Protection Agency as provided for in the Safe Drinking Water Act. Projects that might affect a sole source aquifer are subject to special review procedures.

**State Historic Preservation Officer.** The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

**State Historic Programs.** Educational aid programs run by states in support of local school districts. Accounts for majority of revenues available to local districts.

**State-Sensitive/State-Recognized Species.** Plant and wildlife species in each state that are monitored and listed for purposes of protection.

**Terrestrial.** Living on or in, or growing from, the land.

**Threatened Species.** Plant and wildlife species likely to become endangered in the foreseeable future.

**Ton.** A unit of weight equal to 2,000 pounds.

**Topsoil.** The upper or productive layer(s) of a soil.

**Total Dissolved Solids.** The concentration of solid materials that are dissolved in a sample of water; determined as the weight of the residue of a water sample upon filtration and evaporation divided by the volume of the sample.

**Total Water Use.** The amount of water withdrawn from the natural resource base for a beneficial purpose, excluding water used for hydroelectric power generation, and certain nonconsumptive uses such as once-through cooling water for thermoelectric power generation, wildlife habitat, and fish farming.

**Unconfined Aquifer.** An aquifer where the water table is exposed to the atmosphere through openings (pores) in the overlying materials.

**Unemployment Rate.** The number of civilians, as a percentage of the total civilian labor force, without jobs but actively seeking employment.

**Unique and Sensitive Habitats.** Areas that are especially important to regional wildlife populations or protected species that have other important biological characteristics (e.g., severe wintering habitats, nesting areas, and wetlands).

**Upland.** Ground elevated above bottomlands (e.g., rolling hill terrain and terraces).

**Volume (Transportation).** The total number of vehicles that pass over a given point or section of a roadway during a given time interval. Volumes may be expressed in terms of annual, daily, hourly, or subhourly periods.

**Water Table.** The sustainable volume of water discharged from a well per units of time, often expressed in gallons per minute.

**Watt.** A unit of electrical power equal to 1/756th horsepower.

**Well Yield.** The sustainable volume of water discharged from a well per unit of time, often expressed in gallons per minute.

**Wetlands.** Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil, including swamps, marshes, bogs, and similar areas.

**Zoning.** The division of a municipality (or county) into districts for the purpose of regulating use, bulk of building, required yards, necessary off-street parking, and other prerequisites for development. Zones are generally shown on a map and the text of the zoning ordinance specifies requirements for each zoning category.

## ACRONYMS

AADT	Average Annual Daily Traffic
AAQS	Ambient Air Quality Standards
ABOS	Air Base Operability Squadron
ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
AFR	Air Force Regulation
AICUZ	Air Installation Compatible Use Zone
AMARC	Aerospace Maintenance and Regeneration Center
APZ	Accident Potential Zone
ARAR	Applicable or Relevant and Appropriate Requirements
ARTCC	Air Route Traffic Control Center
CAS	Carolina Archaeological Services
CBD	Central Business District
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFE	Conventional Forces in Europe
CFR	Code of Federal Regulations
CLECO	Central Louisiana Electrical Company
COE	Army Corps of Engineers
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DERP	Defense Environmental Restoration Program
DHEC	Department of Health and Environmental Control
DOD	Department of Defense
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EAC	President's Office of Economic Adjustment
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EP	Extraction Procedure
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAC	Forward Air Control
FEIS	Final Environmental Impact Statement
FIG	Fighter Interceptor Group
FL	Flight Level
FMSE	Fuels Mobility Support Equipment
FY	Fiscal Year
GLCM	Ground-Launched Cruise Missile
GWSA	Grand Strand Water and Sewer Authority
HC	Hydrocarbons
HUD	Department of Housing and Urban Development
ICBM	Intercontinental Ballistic Missile

IFR	Instrument Flight Rules
IRP	Installation Restoration Program
JP-4	Jet Petroleum (Grade 4)
JUA	Joint Use Agreement
LOS	Level of Service
LPG	Liquefied Petroleum Gas
MCL	Maximum Contaminant Level
MOA	Military Operating Area
MOGAS	Automotive Gasoline
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NZ	Noise Zone
OEA	Office of Economic Adjustment
POL	Petroleum, Oil, and Lubricants
PSD	Prevention of Significant Deterioration
RAMP	Radon Assessment and Mitigation Program
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
SCUSTCR	South Carolina Underground Storage Tank Control Regulations
SCWMRD	South Carolina Wildlife and Marine Resources Department
SCWRC	South Carolina Water Resources Commission
SHPO	State Historic Preservation Officer
SOS	Special Operation Squadron
SPRP	Spill Prevention and Response Plan
STAMINA	Standard Method
TAC	Tactical Air Command
TCS	Tactical Control Squadron
TEPC	Tucson Electric Power Company
TFS	Tactical Fighter Squadron
TFW	Tactical Fighter Wing
TDS	Total Dissolved Solids
TMTG	Tactical Missile Training Group
TMTS	Tactical Missile Training Squadron
TRACON	Tucson Radar Approach Control
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal
TSP	Total Suspended Particulates
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
V/C	Volume-to-Capacity
VFR	Visual Flight Rules
WSA	Weapon Storage Area

## UNITS OF MEASUREMENT

°C	degrees Celsius
cy	cubic yard
dB	decibel
dBA	decibel on the A-weighted scale
g	acceleration of gravity
gpd	gallons per day
kWh	kilowatt-hour
$L_{dn}$	day/night equivalent noise level
$L_{eq}$	energy-equivalent continuous noise level
MMcf	million cubic feet
MG	million gallons
MGD	million gallons per day
mg/l	milligrams per liter
mi	mile
pCi/l	picoCuries per liter
pph	parts per hundred
$PM_{10}$	particulate matter (less than 10 micrometers in diameter)
ppm	parts per million
$\mu\text{g/l}$	micrograms per liter

## CHEMICAL ABBREVIATIONS

CO	Carbon Monoxide
DCE	Dichloroethylene
HC	Hydrocarbons
$O_3$	Ozone
$NO_x$	Nitrogen Oxide
$NO_2$	Nitrogen Dioxide
Pb	Lead
PCB	Polychlorinated Biphenyls
$SO_x$	Sulfur Oxide
$SO_2$	Sulfur Dioxide
TCE	Trichloroethylene
VOC	Volatile Organic Compounds

## **APPENDIX B - RECORD OF PUBLIC NOTIFICATION**

As part of the scoping process, the Air Force conducted a series of meetings to determine the issues and concerns that should be identified in the Environmental Impact Statement (EIS) for the proposed closure of Myrtle Beach Air Force Base (AFB), South Carolina, or its two alternatives, Davis-Monthan AFB, Arizona, or England AFB, Louisiana. The Air Force notified the public of both the scoping meetings and the preparation of the EIS through Notices of Intent (NOIs) published in the *Federal Register* on 9 February and 4 May 1990. Copies of the NOIs follow.

NOTICE OF INTENT  
TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS  
MYRTLE BEACH AFB, SC

The United States Air Force intends to study the feasibility of closing Myrtle Beach AFB, SC, by 1993 as a result of force structure change. As part of that study process, the Air Force will prepare two Environmental Impact Statements (EISs) for use in decision-making regarding the proposed closure and final disposition/re-use of property at Myrtle Beach AFB.

The first Environmental Impact Statement (EIS) will be prepared to assess the impact of the possible closure of Myrtle Beach AFB, SC. The EIS will discuss the withdrawal of A-10A aircraft which will undergo force structure retirement and relocation. Active duty Air Force tenant units not inactivated would also be relocated. The EIS will also analyze the no action alternative to closing Myrtle Beach AFB, SC.

The other EIS will only be completed if there is a final decision to close the base. This EIS would cover the final disposition/re-use of excess property. All property would be disposed of in accordance with provisions of Public Law, federal property disposal regulations and Executive Order 12512.

The Air Force is planning to conduct a series of scoping meetings to determine the issues and concerns that should be addressed in the two EISs. Notice of the time and place of the planned scoping meetings will be made available to public officials and announced in the news media in the areas where the meetings will be held.

To assure the Air Force will have sufficient time to consider public inputs on issues to be included in the development of the first EIS, comments should be forwarded to the addressee listed below by March 15, 1990. However, the Air Force will accept comments to the addressee below at any time during the environmental impact analysis process.

For further information concerning the study of Myrtle Beach AFB for possible closure and EIS activities, contact:

Director of Environmental Planning  
AFRCE-BMS/DEP  
Norton AFB CA 92409-6448

DEPARTMENT OF DEFENSE  
Department of the Air Force  
AMENDED  
NOTICE OF INTENT  
TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS  
MYRTLE BEACH AIR FORCE BASE, SOUTH CAROLINA  
ENGLAND AIR FORCE BASE, LOUISIANA  
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

A Notice of Intent (NOI) was published in the Federal Register on February 9, 1990. This amended NOI supplements the original NOI by adding two reasonable alternatives for environmental analysis.

The United States Air Force intends to study the feasibility of closing Myrtle Beach AFB, South Carolina. England AFB, Louisiana, and Davis-Monthan AFB, Arizona, have been determined to be reasonable alternatives which must be evaluated under the National Environmental Policy Act and implementing Council on Environmental Quality Regulations. As part of that study process, the Air Force will prepare two Environmental Impact Statements (EISs) for use in decision making regarding the proposed closure and final disposition/reuse of property in the event the Air Force decides to close any of the bases.

The first Environmental Impact Statement (EIS) will be prepared to assess the impact of the possible closure of each Air Force Base. The EIS will discuss the possible withdrawal of aircraft from each base. The aircraft would undergo force structure retirement and/or relocation. The Aerospace Maintenance and Regeneration Center would not be inactivated and will remain in place. All other active duty Air Force tenant units not inactivated would also be relocated. The EIS will also analyze the no action alternative to closing each Air Force Base.

The second EIS would be prepared only if there is a final decision for closure. This EIS would cover the final disposition and reuse of excess property. All property disposal will be in accordance with provisions of public law, federal property disposal regulations and Executive Order 12512.

The Air Force will conduct scoping meetings to discuss the issues and concerns that should be addressed in the two EISs. Notice of the time and place of the proposed scoping meetings will be made available to public officials and announced in the news media in the areas where the meetings will be held.

To assure the Air Force will have sufficient time to consider public inputs on issues to be included in the development of the first EIS, comments should be forwarded to the addressee listed below by June 7, 1990. However, the Air Force will accept comments to the addressee below at any time during the environmental impact analysis process.

For further information concerning the study at Myrtle Beach, England or Davis-Monthan Air Force Bases and the related EIS, please contact:

Director of Programs & Environmental Division  
AFRCE-BMS/DEP  
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# **APPENDIX C - DRAFT ENVIRONMENTAL IMPACT STATEMENT MAILING LIST**

## **MYRTLE BEACH AFB, SOUTH CAROLINA**

### **ELECTED OFFICIALS**

#### **Federal Officials**

##### ***U.S. Senate***

Senator Ernest F. Hollings  
Senator Strom Thurmond

##### ***U.S. House of Representatives***

Congressman Robin Tallon

#### **State Officials**

##### ***Governor***

The Honorable Carroll Campbell  
Mr. Danny Cromer  
Grant Services Office of the Governor  
The Honorable Nick Theodore  
Lieutenant Governor  
Mr. Jerry Branham  
Office of the Governor

##### ***Senate***

Senator J. M. "Bud" Long

##### ***House of Representatives***

Representative Liston Barfield  
Representative Kenneth Corbett  
Representative Dick Elliott  
Representative Douglas Hinds  
Representative Tom Keegan

#### **Local Officials**

Honorable Jack Bland  
Mayor of Pawleys Island  
Colonel Edsel Deville  
Commander 354th Combat Support Group  
Honorable Bob Grissom  
Mayor of Myrtle Beach  
Colonel Robert Jenkins  
Commander 354th Tactical Fighter Wing  
Honorable Dick M. Johnson  
Mayor of Surfside Beach

Tom Leath

Myrtle Beach City Manager  
Honorable Ike Long  
Mayor of Conway  
Honorable Otto Marsh  
Mayor of Briarcliffe Acres  
Honorable Laurie McLeod,  
Chairman Horry County Council  
A. William Moss  
North Myrtle Beach City Manager  
Honorable Phil Tighman  
Mayor of North Myrtle Beach

### **PUBLIC AGENCIES**

#### **Federal Agencies**

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Naval Facilities Engineering Command  
Charleston, South Carolina

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#### **LIBRARIES**

South Carolina State Library, Columbia  
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#### **OTHER ORGANIZATIONS**

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Kevin Hawes  
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Raymond Scholl  
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Mr. & Mrs. Howard Selby  
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Note: Eight DEIS requestor names were illegible.

## **DAVIS-MONTHAN AFB, ARIZONA**

### **ELECTED OFFICIALS**

#### **Federal Officials**

##### *U.S. Senate*

Senator Dennis DeConcini  
Senator John McCain

##### *U.S. House of Representatives*

Congressman James Kolbe  
Congressman Morris Udall

#### **State Officials**

##### *Governor*

The Honorable Rose Mofford

##### *Senate*

Senator William J. Delong  
Senator Jesus Higuera  
Senator Jeffrey Hill  
Senator Jaime Gutierrez  
Senator John T. Mawhinney  
Senator Peter Rios  
Senator Alan Stephens

##### *House of Representatives*

Representative Bart Baker  
Representative David Bartlett  
Representative Carmen Cajero  
Representative Frank Art Celaya  
Representative William J. English  
Representative Ruth Eskesen  
Representative Peter Goudinoff  
Representative Phillip Hubbard  
Representative Jack B. Jewett  
Representative John Kromko  
Representative Patti Noland  
Representative Richard Pacheco  
Representative Cindy Resnick  
Representative Eleanor Schorr  
Representative Ruth Solomon

#### **Local Officials**

Kendall Bert  
Economic Development Director,  
City of Tucson

Dan Eckstrom  
Chairman, Pima County Board of  
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Honorable E.S. (Steve) Engle  
Mayor of Oro Valley

Honorable Ora Hurn  
Mayor of Marana

Greg Lunn  
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Senator J. Bennett Johnston

##### ***U.S. House of Representatives***

Congressman Clyde Holloway

#### **State Officials**

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The Honorable Charles "Buddy" Roemer

##### ***Senate***

Senator Donald G. Kelly  
Senator Joe McPherson

##### ***House of Representatives***

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Representative Carl N. Gunter, Jr.  
Representative Charles Herring  
Representative Raymond Laborde  
Representative Dale Smith  
Representative John Smith

#### **Local Officials**

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Mayor of Pineville

Mr. Johnny Downs  
President, Alexandria City Council

Mr. Richard Nunally  
President, Rapides Parrish Police Jury

Honorable Ned Randolph  
Mayor of Alexandria

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Department of Agriculture  
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Department of Agriculture  
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Office of Intergovernmental Relations  
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Bureau of Indian Affairs  
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Washington, DC

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Office of Environmental Project Review  
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Grants Management Division  
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#### **State Historic Preservation Office**

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**APPENDIX D - AIR FORCE POLICY - MANAGEMENT OF  
ASBESTOS AT BASES FOR WHICH THE GENERAL SERVICES  
ADMINISTRATION IS THE DISPOSAL AGENT**

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**AIR FORCE POLICY**

**MANAGEMENT OF ASBESTOS AT BASES FOR WHICH  
THE GENERAL SERVICES ADMINISTRATION IS THE DISPOSAL AGENT**

**INTRODUCTION**

Asbestos in building facilities is managed because of potential adverse human health effects. Asbestos must be removed or controlled if it is in a location and condition that constitutes a health hazard or a potential health hazard, or it is otherwise required by law (e.g., schools). The hazard determination must be made by a health professional (in the case of the Air Force, a Bioenvironmental Engineer) trained to make such determinations. While removal is a remedy, in many cases management alternatives (such as encapsulation within the building) are acceptable and cost-effective methods of dealing with asbestos. The keys to dealing with asbestos are knowing its location and condition and having a management plan to prevent asbestos containing materials that continue to serve their intended purpose from becoming a health hazard. There is no alternative to management of such serviceable asbestos containing materials, because society does not have the resources to remove and dispose of all asbestos in all buildings in the United States. Most asbestos is not now nor will it become a health hazard if it is properly managed.

There are no laws applicable to bases that specifically mandate the removal or management of asbestos in buildings, other than the law addressing asbestos in schools (P.L. 99-519). Statutory or regulatory requirements that result in removal or remediation of asbestos are based on human exposure or the potential for human exposure (e.g., National Emission Standards for Hazardous Air Pollutants [NESHAPS] = no visible emissions; OSHA = [..number..] of airborne fibers per cc). There are no statutory or other mandatory standards, criteria, or procedures for deciding what to do with asbestos. Thus, health professional judgment based on exposure levels or potential exposure levels must be the primary determinant of what should be done with asbestos.

On December 29, 1989 the Air Force adopted a policy for managing asbestos at bases being closed pursuant to the Base Closure and Realignment Act (P.L. 100-526). The Air Force is the disposal agent for those properties and is entitled to use the sales proceeds to offset the costs of base closure and realignment. Accordingly, the policy supports removing asbestos in circumstances where a building is unsalable without removal, or where removal is economically beneficial (e.g., the increase in subsequent fair market value exceeds costs of removal).

The Air Force, however, is usually not a disposal agent for real property and improvements. Federal law makes the General Services Administration (GSA) responsible for disposal, and makes the sales proceeds unavailable to the agency which determined that the property was excess to its needs. Absent legislation like P.L. 100-526 which changed these procedures for five particular Air Force bases, the Air Force has no authority to dispose of closed bases or to make use of sales proceeds to offset closure expenses. In such circumstances the Air Force will follow the standard governmental practice of making the property available to GSA for disposal "as is, where is." The Air Force will survey for asbestos and inform GSA of its presence and condition but will remove it only where necessary to protect human health.

The following specific policies will apply to bases closed or realigned for which GSA is the disposal agent:

1. Asbestos will be removed if:
  - (a) The protection of human health as determined by the Bioenvironmental Engineer requires removal (e.g., exposed friable asbestos within a building) in accordance with applicable health laws, regulations and standards.
  - (b) A building is, or intended to be, used as a school, child care facility, or hospital.
2. When asbestos is present but none of the above applies, the asbestos will be managed using commonly accepted standards, criteria and procedures to assure sufficient protection of human health and the environment, in accordance with applicable and developing health standards.
3. A thorough survey for asbestos (including review of facility records, visual inspection, and, where appropriate as determined by the Bioenvironmental Engineer and the Base Civil Engineer, intrusive inspection) will be conducted by the Air Force prior to sale. This information will be reported to GSA in accordance with their regulations.
4. Encapsulated asbestos in a building structure, friable or not, is not regarded as hazardous waste by the Air Force, nor does encapsulation within the structure of a building constitute "storing" or "disposing of" hazardous waste. Asbestos incorporated into a building as part of the structure has not been "stored" or "disposed of."
5. Friable asbestos, or asbestos that will probably become friable, that has been stored or disposed of underground or elsewhere on the property to be sold will be properly disposed of, unless the location is a landfill or other disposal facility properly permitted for friable asbestos disposal.
6. Since other considerations must be taken into account at bases that are continuing to operate, this policy does not apply to them, nor is it necessarily a precedent for asbestos removal policy on them.